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SUMMARY OF RECENT ABSTRACTS *

IX. LEPROSY †

General: Classification

Chaussinand (p. 118) has written a textbook on leprosy, and Dubois (p. 119) a book on diagnosis and treatment; both have been very favourably reviewed.

Cochrane (p. 758) suggests certain modifications of the Madrid classification of leprosy, for which the original should be consulted, and Nishiura (p. 198) suggests the addition of a neural type to it.

Epidemiology

In a long review of the epidemiology and prophylaxis of leprosy Bechelli (p. 757) ranges over the known incidence in the world, the factors favouring spread, the measures taken to prevent it, and treatment. This is a very full consideration of the subject, with an extensive list of references.

Del Vecchio (p. 1123) gives the results of a recent census of leprosy in Italy, where 434 patients were known, mostly in the south; 188 of them were in institutions. He (p. 1240) refers to laws recently promulgated there for leprosy patients. In a fairly high proportion of cases the disease is acquired within the country.

In Morocco Rollier *et al.* (p. 1344) calculate that the incidence of leprosy is 1 per 1,000 in Moslems, and 1 per 10,000 in Jewish and European populations.

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1956, v. 53. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on leprosy in this series see the November issues of the *Tropical Diseases Bulletin* each year since 1939.

In a survey in Uganda Brown (p. 947) found leprosy in 1·7% of 55,947 persons examined, with blindness in 1% of the leprous persons. From experience in both Uganda and Nigeria he (p. 1242) concludes that leprosy has no particular predilection for childhood, and he thinks it a mistake to assume that susceptibility diminishes with age. The more susceptible children are probably those whose parents (or parent) have had the disease.

Davey *et al.* (p. 1241) show that before 1948 the incidence of leprosy in Eastern Nigeria was very high (for example 3·4% in one area) but the disease was mild, only a minority of patients having the lepromatous form. Since then there has been a steady reduction and the authors attribute this possibly to a natural regression in the epidemic, or to some cross immunity with tuberculosis, or to the general improvement in sanitation and the local segregation villages, but they have no doubt that the intense and widespread control work, including massive treatment programmes, has been of extreme importance.

Cochrane (p. 600) calculates that the incidence of leprosy in South Korea is 5 per 1,000, and that one quarter of the patients are infective. It is a house disease rather than a village disease as in India, because the family unit is compact. He recommends certain steps to be taken for control, which are largely matters of broad organization.

Leprosy patients admitted in the period 1921–53 to the Carville institution in the United States are mostly from the southern States, and Badger (p. 601) remarks that 637 of the 1,465 were born in foreign countries. The disease is confined to limited areas of the States in which it is found.

Montestruc (p. 1345) refers to 821 leprosy patients registered in Martinique in 1948–54, of whom 28·3% were lepromatous. In spite of sulphone treatment the disease seems to be increasing, largely because patients take treatment irregularly.

Convit and Gonzalez (p. 892) give an account of leprosy in Venezuela, where 5,550 cases were known in 1950, with 58·4% lepromatous, 20·2% tuberculoid and the rest indeterminate. In British Guiana the incidence of leprosy is about 2·7 per 1,000; the ratio of lepromatous to tuberculoid disease is highest in people of African descent. Nicholas (p. 197) describes measures of control now practised.

In tests with the Dharmendra antigen in Surinam Gehr (p. 1346) found high positive rates in the staffs of leprosy institutions and in contacts, and also, surprisingly, in Bush Negroes, in whom the incidence of known leprosy is low.

In Brazil the incidence of known leprosy in 1950 was 1·12 per 1,000; de Souza-Araújo (p. 602) states that there were 93 clinics and 29 preventoria for children, but many more are needed. There are 4 centres for research and training.

In Easter Island there are 34 leprosy patients in the community of 800 persons (Roberto, p. 259).

Aetiology

Brieger and Glauert (p. 1432) describe the appearances of the leprosy bacillus on electron microscopy. The organism is pleomorphic and if the variations in shape do not represent stages in degeneration, they may indicate a complex life history. From a study of *Myco. leprae* by light microscope, phase-contrast and electron microscope, Chatterjee *et al.* (p. 1347) conclude that it may exist in 2 phases—a slow phase resulting in solid dense forms, and a rapid phase resulting in forms possessing alternate light and dark regions.

Contreras *et al.* (p. 1242) use Sudan Black to differentiate the tubercle bacillus from the leprosy bacillus (which it does not stain).

By treating frozen skin sections to demonstrate phosphatase activity, by a method which is described, and by suitable staining, Gault *et al.* (p. 323) were able to confirm the presence of bacilli in swollen and apparently degenerated axons, but could not prove that they had actually travelled along the axons. Trespalacios and Piñeyro (p. 758) failed to find leprosy bacilli in the cords and placentas of 27 children of leprous patients (mostly lepromatous).

Lai (p. 70) attempted to infect Taiwan monkeys (*Macacus cyclopis*) with material from human lepromata, with equivocal results, but De Souza-Araujo (p. 1353) produced lesions in monkeys by inoculating acid-fast organisms isolated and cultivated from patients with lepromatous leprosy.

Pathology: Clinical Findings

Skin sections from 45 leprosy patients were sent to 7 pathologists for report, and the opinions expressed differed considerably. Kooij (p. 1004) concludes that different cases of the same group may show different histological pictures and that though agreement between histological findings and other criteria strengthens the diagnosis, difference between histological findings and the other criteria does not necessarily mean that these criteria are unreliable.

Khanolkar and Cochrane (p. 1434) describe 4 cases of dimorphous leprosy, in which histological appearances characteristic of the 2 main types of leprosy were found. This form may be transformed into the lepromatous or the tuberculoid type, more often the former. Cochrane (p. 762) recapitulates the work of Khanolkar on the mode of entrance of the leprosy bacillus into the ultimate terminals of the nerves and thence along the axis cylinders, whence they burst into the corium.

Dastur (p. 1004) has made a pathological study of muscles affected in leprous neuritis, of which details are given in the abstract, and discusses the role of anatomical and mechanical forces in determining the degree of disease in infected nerves, and the effects of pressure and ischaemia in causing blockage and subsequent necrosis.

Powell and Swan (p. 602) describe the pathological changes in 50 subjects with leprosy (48 lepromatous) brought to autopsy at Carville,

U.S.A. Details should be sought in the original, but special note is made of the fact that secondary amyloidosis was seen in 23, especially in the kidneys. In the United States the commonest cause of death in lepromatous leprosy is secondary amyloidosis, but there is no clear correlation between the degree of leprosy and the development of amyloidosis. Shuttleworth and Ross (p. 1433) show that persistent proteinuria is a constant finding in this condition, and they discuss prognosis.

In nephrotic cases of lepromatous leprosy Tarabini-Castellani (p. 1349) found the albumin fraction of the blood proteins always higher than normal, and the globulins usually lower (gamma always); the same picture was found in lepromatous cases without nephrosis, and the conclusion is that it is not proteinuria, but leprosy itself, which causes it.

Prieto Lorenzo (p. 1124) gives a general account of the neural manifestations in leprosy. Chatterjee (p. 63) thinks that the various neural signs and symptoms are more likely to be due to diminution of blood supply to the nerves and skin than to degeneration of the nerves, and that this diminution of blood supply may be caused by pressure of a thickened nerve sheath on the vasa vasorum.

Lucas (p. 1351) describes 2 cases of neural leprosy which were at first diagnosed as syringomyelia. In comment Muir remarks that in such cases, when nerves are not thickened enough to be palpable, tingling can generally be elicited by percussion over the nerve supplying the affected cutaneous area.

Paterson (p. 199) divides bone changes in leprosy into: bone destruction, joint changes, bone absorption and osteoporosis, and describes the radiological appearances. Chardome and Lechat (p. 200) also describe the radiological appearances of lesions of the bones of the hands in leprosy.

A common finding in leprosy is disappearance of the nasal spine; Lechat and Chardome (p. 761) discuss the subject, and relate it to disease of the mucous membrane and perforation of the cartilaginous septum.

Furniss (p. 1434) states that the testis is commonly affected in leprosy, and describes the histological features noted.

Wade (p. 1350) discusses some of the less familiar forms of leprosy, for which details should be sought in the original. He mentions the "spectrum" concept, considering that though polar cases are most common there are various gradations. The paper should be read in full.

The reactive condition which occurs in lepromatous leprosy is not, according to Pepler *et al.* (p. 63), true erythema nodosum. They give reasons for this opinion, and suggest the name panniculitis nodosa leprosa for the condition. Tajiri (p. 1350) describes 2 forms of reaction in tuberculoid, and 3 forms in lepromatous leprosy, especially an acute infiltration syndrome which occurs abruptly in lepromatous disease, sometimes overnight, with an erysipelas-like eruption. The Mitsuda test is generally positive, though not so strongly as in reactional tuberculoid.

This reaction may be a sign that lepromatous leprosy (formerly borderline) is regaining active resistance and returning to the tuberculoid form. De Souza Lima (p. 1435) describes the "pseudoexacerbation" reactional state, so called because it results in improvement, not in exacerbation of the disease. It occurs in patients with lepromatous leprosy under sulphone treatment, but has the clinical appearance of the reactional tuberculoid eruption.

Lepromin and Other Tests

Chaussinand *et al.* (p. 893) point out that the objection to lepromin antigen prepared according to Wade's method is that there is too much tissue debris, and the bacilli are gathered together in masses or globi. They procure a better preparation by treating the Wade antigen with papain or by subjecting a suspension of leprosy bacilli to ultrasonic action for 4 hours to dissociate the bacilli. These preparations gave good results in man but with the antigen treated by ultrasonic waves a slight persistent local reaction was observed in lepromatous patients, but injection of supernatant fluid after centrifuging gave no local reaction. The papain preparation gave no false positive results. The two methods are to be combined. Lew and Carpenter (p. 1432) describe a technique for separating leprosy bacilli from lepromatous tissue by the action of trypsin.

The capacity to react to lepromin is usually taken to indicate resistance, and lepromatous leprosy is commoner in males than females, but Guinto *et al.* (p. 324) did not find any difference in the proportions of healthy males and females who reacted to it, nor did they (p. 325) find any indication that household exposure to the disease lowered resistance or increased the chance of acquiring reactivity.

The antigen for the Mitsuda test is now difficult to obtain, and Floch (p. 64) has experimented with various dilutions with the object of conserving it. He suggests 2 dilutions—1 in 150 and 1 in 750—for general use. There is some loss of positivity with the greater dilution. He (pp. 64, 1005) found, however, that the addition of 2% of liquid paraffin and 12% of glycerin enhanced the action of dilute lepromin. Schujman (p. 1005) tried dilutions of lepromin in patients with leprosy, finding that strong reactors to full-strength antigen reacted well to high dilutions, but that some weaker reactors were often negative to the dilutions. He advises that weak preparations should be used only in patients known to be strong reactors.

Ignacio *et al.* (p. 1006) report an increasing number of positive reactions in a group of children repeatedly tested with lepromin, who had been separated from leprous parents at birth.

In a series of tests with tuberculin and lepromin in children in the Philippines Guinto *et al.* (p. 65) found a relationship between the (late) Mitsuda reaction and the PPD reaction, which suggests that tuberculization of a population may be responsible for concurrent acquirement of reactivity to lepromin. On the other hand, parallel tuberculin and

lepromin tests in part of the Belgian Congo show that infection with leprosy occurs at a much earlier age than infection with tuberculosis, and SWERTS (p. 760) argues that the results do not support the idea that tuberculous infection produces a positive lepromin reaction.

HALE *et al.* (p. 325) tested various groups of people in Malaya with tuberculin and lepromin; some were healthy, some tuberculous, some had received BCG and some had leprosy. The conclusion reached is that leprosy may infect a selected population consisting of people who are Mantoux negative, tuberculous infection giving some protection against leprosy. The paper should be read in full. FERNANDEZ and CABANILLAS (p. 201) injected lepromin into children who had no known contact with leprosy, and found that some of them were thereby weakly sensitized to tuberculin. [See also below, *Control and Prevention.*]

Other Tests

False positive serum tests for syphilis were found in leprosy patients by RUGE (p. 759) (25% false positives), TARABINI CASTELLANI (p. 453) and ROLLIER *et al.* (p. 66) (especially in lepromatous disease). The pallida reaction and the TPI test were much more specific and much less frequently positive, though in the French Sudan LAURET and KERBASTARD (p. 1123) found general agreement between the TPI test and the Kolmer, Kline, VDRL and Pallignost tests, and observed, moreover, that anti-syphilitic treatment reduced the titres of these classical tests. ROY and BANERJEE (p. 323) used a modified haemagglutination test, with tuberculin as antigen, in leprosy. Positive results were obtained and the authors conclude that antibodies against tuberculosis and leprosy appear to have something in common in this respect, but as pointed out by Muir in comment, they do not say what relationship the patients had with tuberculosis.

Treatment

RIDLEY (p. 200) shows that response to treatment often takes the form of diminution of foci in size and number, without alteration of bacterial density. Serial biopsies at intervals of 2 months, taken in conjunction with a clinical impression of the number of nodules, probably afford the best available index to progress in a therapeutic trial, but multiple smears provide a more rigorous test of cure.

In the *New England Journal of Medicine* (p. 604) there are short reviews on the treatment of leprosy by drugs and on the role of surgery.

GARRETT (p. 1008) sums up 5 years of mass DDS treatment in Nigeria, the results of which have been very favourable. Almost all lepromatous cases have much improved, most of them remarkably; the addition of isoniazid did not help much, but reaction seemed to be less with it; dermatitis and hepatitis are not so troublesome as was feared; no definite evidence of resistance to DDS has been found. Relapses have occurred in patients who have had insufficient or irregular treatment. The author

prefers administration of tablets for oral use rather than injections. Relvich (p. 761) reports a number of relapses in patients with various types of leprosy, in Western Nigeria, all being treated with sulphones. He thinks that it may be necessary to keep the patients on sulphones for the rest of their lives. In comment Muir suggests that these patients may have more intractable disease than those at Uzuakoli in Eastern Nigeria. Davey (p. 605) used Avlosulfon, a preparation which breaks down rapidly in the body to release half its weight of DDS, for patients with leprosy of various types, and obtained results very similar to those achieved with DDS by mouth.

Swerts (p. 763) sums up the results of 3 years of sulphone treatment in the Belgian Congo; in lepromatous disease there was definite improvement in 90%, but bacteriological findings had become negative in only 11·24%, and very much reduced in 37·85%.

In North Borneo sulphetrone treatment leads to rapid disappearance of lepromatous lesions, but Blaauw (p. 66) remarks on the slow disappearance of the bacilli, commenting that cure cannot be hoped for under 3 years of treatment.

A favourable report on Sulfon-Cilag, a soluble product, is given by Browne (p. 1009) who observed his 67 patients for up to 36 weeks of treatment.

Amendola (p. 1009) remarks on the immense value of sulphone treatment for leprosy of the eye; the disease is now limited to the invasion which occurred before this treatment was started, and surgery of the eye now offers better chance than before of restoring the transparent media.

Isoniazid has been used in conjunction with sulphones. Garrett (p. 203) found a slight advantage over DDS alone, and in a few patients the combination was of great value, and Dharmendra and Chatterjee (p. 1243) also found an advantage; the addition of DDS probably delays the development of resistance to isoniazid. Utku (p. 1124) writes favourably of the combination, but he uses isoniazid alone for injection into nodules. Scragg (p. 327) also used isoniazid alone, in large doses (up to 9 mgm. per kgm. daily) with good results, but in comment Muir suggests that there may have been some residual effect from sulphones previously given. On the other hand Jopling and Ridley (p. 203), in a controlled test, could find no advantage in using isoniazid with sulphones; the sulphones alone were just as effective.

Tarabini Castellani (p. 1244) tried isoniazid and streptomycin, together with glutamic acid as a detoxifying agent, and though he thinks that the best treatment is with sulphones, there are some patients who improve best on isoniazid and streptomycin, though the improvement is transitory unless sulphones are given later. A combination of isoniazid and PAS was not useful in lepromatous leprosy, though valuable in 2 patients with tuberculoid leprosy who had not benefited from sulphones; Montestruc (p. 1125) reports also that spiramycin was disappointing and chlorpromazine useless, even in the lepra reaction, though sodium

salicylate had some value for reaction. The *Myco. marianum* antigen was abandoned as useless in treatment.

Davison (p. 67) tried thiosemicarbazone, with fair results in tuberculoid cases but poor results in lepromatous disease, and Roy (p. 327) found it useful in patients who experienced the lepra reaction when treated with DDS.

Some apparent benefit was observed in a few cases of leprosy of various types when the antibiotic acidomycin was injected intradermally into the lesions by Satani *et al.* (p. 328).

Buu-Hoï *et al.* (p. 202) tried 2 new drugs in leprosy of various forms. One (diaminodiphenylsulphoxide, or DDSO) produced some improvement, and the other (diethyloxythiocarbanilide, or Dialide) was similar, but rendered the nasal mucosa negative more rapidly than sulphones. Tests with a diphenylthiourea compound (similar to Dialide, above) indicate that its action compares favourably with that of DDS in all types of leprosy, and that its toxicity is low; Davey and Currie (p. 1435) write favourably of this substance, but it is not yet known if drug resistance will develop.

Gözsy and Kátó (p. 1348 *bis*) report experiments in mice which suggest that chaulmoogra derivatives induce the same phagocytic activity of the endothelial cells of the skin capillaries, and of the reticulo-endothelial system, as is induced by histamine, and probably act by liberating the histamine and stimulating the cellular defence mechanism. Hydnosulfone is a condensation product of hydnocarpic acid with DDS, and Dharmendra and Chatterjee (p. 763) used it by mouth for lepromatous and tuberculoid disease, finding it of definite value, particularly for patients who cannot tolerate other drugs.

Contreras *et al.* (p. 1243) gave BCG repeatedly by mouth to lepromatous patients and observed improvement in general health, with permanent disappearance of the reactive state in some cases.

Blanc and his colleagues (pp. 69, 454) have used an antigen from *Myco. marianum* in treatment, and claim that it will convert a negative Mitsuda state to a positive state, and that clinical results are good, rivalling those obtained with sulphones. In comment Muir notes that no mention is made of bacteriological improvement, and questions the accuracy of some of the conclusions reached.

Prieto Lorenzo (p. 1352) refers to the many substances which have been used for the treatment of leprous neuritis, commenting that this number implies lack of reliability. Surgical measures may be necessary, especially in acute reactions where irreparable damage may be done to nerves by pressure in a short time, if this is not quickly relieved. For thickened painful nerves Gramberg (p. 328) performs the operation of decapsulation under local anaesthesia. The results are good—pain and paraesthesia usually disappear, and the psychological effect is profound.

Newman and Anderson (p. 201) treat superficial ulcers by exposing them to the sun and applying dyes and acriflavine. Infected ulcers are

poulticed with magnesium sulphate in glycerin, and chronic deep ulcers are scraped and enclosed in plaster casts. Dharmendra *et al.* (p. 327) use a by-product of DDS as a local dressing, with considerable success in cases which had not improved on other forms of treatment, and Lauret and Kerbastard (p. 764) use a glycerin solution or an ointment of trichloracetic acid and salicylic acid, with good results.

Several methods have been advocated for treatment of the lepra reaction. Contreras *et al.* (p. 453) usually treat it by haemotherapy, but have had excellent results with cortisone, which they reserve for intractable cases; Prieto Lorenzo (p. 1007) reports very good results with cortisone and also with corticotrophin, and Montestruc (p. 604) has given cortisone daily in doses of 25–175 mgm. for periods up to 15 months, thus preventing the reaction, but the patients must be carefully watched. Destombes and Chambon (p. 326) found phenylbutazone as good as corticotrophin. González Prendes *et al.* (p. 762) report spectacular results with mepacrine, and Lechat (p. 201) satisfactory results with chlorpromazine.

Intraneural injection of hyaluronidase in procaine solution in patients with frequently repeated nerve reactions was found by Garrett (p. 1007) to be most useful, but he does not use this treatment if caseation is suspected, for fear of spread of the caseation.

Control and Prevention

A good response is reported by Ross (p. 1010) from Northern Nigeria to a scheme of out-patient leprosy clinics attached to a sleeping sickness dispensary. Treatment with DDS was carried out by dispensary attendants with minimum supervision by a medical officer.

In Uganda the incidence of leprosy is high, and segregation is impossible. Brown (p. 1436) estimates the incidence of lepromatous cases as 5–19% of the total in the various provinces. To deal with the problem in a scattered population the authorities have opened over 40 treatment villages holding up to 400 persons each (optimum 100). Between 30 and 40% of the patients are now able to obtain treatment regularly. Buker (p. 68) writes of the value of leprosy villages in Thailand, where they have been very successful, but in comment Muir makes the point that the degree and quality of supervision are the essential points.

Smith (p. 198) describes the leprosy colonies of southern Korea, and discusses improvements which could be made.

The Department of Health of the Republic of the Philippines (p. 1430) have issued a monograph on the work of the Culion Leprosy colony during the period 1906–1956. This report of a great institution should be read in full. Lara and Ignacio (p. 1431) state that in the pre-sulphone period 20·9% of children born in Culion became infected and showed lesions, against 19·9% in the sulphone period, but that the lesions appeared in the first 3 years in 95% in the pre-sulphone group, against 57% in the later

group. LARA and TIONG (p. 1346) report that many of the patients at Culion, who have been clear of infection long enough to allow them safely to return to the community, do not wish to leave, or have no relatives to go to. This is a social problem, and the authors suggest means which could be taken for the relief of the inmates.

CHAUSSINAND (p. 1010) discusses methods which could be used to test the efficacy of BCG against leprosy. He suggests that it should be given intradermally in infants negative to lepromin and to heat-killed virulent tubercle bacilli, and that, in assessing results, no account should be taken of leprosy which develops within 3 years; in this way infections acquired before the BCG was given would be eliminated from the test. A trial of BCG has been made in the Loyalty Islands, and LACOUR (p. 68) states that observations will be made to assess its value in the future. FERNANDEZ (p. 1006) studied child contacts of lepromatous patients, and though some who had been vaccinated with BCG, and others who were tuberculin-positive, themselves developed leprosy, they did not become lepromatous, as did non-vaccinated tuberculin-negative contacts. He concludes that tuberculous infection probably is protective. PARDO-CASTELLÓ *et al.* (p. 765) found that repeated oral BCG converted some Mitsuda-negative children (mostly separated at birth from leprous parents) to the positive state, and CONVIT *et al.* (p. 329) found that guineapigs and hamsters mostly became positive after being given BCG repeatedly. [See also above, *Tests.*]

MONTESTRUC (p. 603) produces evidence which indicates that BCG has greater affinity than *Myco. marianum* with the leprosy bacillus, and he concludes that *Myco. marianum* is useless in the prophylaxis of leprosy.

Murine Leprosy

In murine leprosy streptomycin was found by HOBBY and DONIKIAN (p. 765) to have only slight effect when given intermittently, but isoniazid had marked effect; the drug diethyldithiolisophthalate shows some activity (NAGUIB and ROBSON, p. 1011). *Charles Wilcocks*

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

East Africa High Commission. **Annual Report of the East African Institute of Malaria and Vector-Borne Diseases, July 1955–June 1956** [Wilson, D. Bagster, Director]. 29 pp., 1 diagram & 2 figs. 1956, Dar es Salaam: Govt. Printer. [Shs. 2/50.]

After the Director's summary Dr. M. T. Gillies describes a technique for age-grouping *Anopheles gambiae*. Firstly, by recognition of the mating plug in females dissected in saline, the mosquitoes may be separated into unfertilized, recently fertilized (plug positive) and fertilized (plug negative). Secondly, the fertilized group is examined qualitatively for ampullary differences which indicate the nulliparous, multiparous and "uncertain" groups. Thirdly, the "uncertain" group is divided according to the diameter of the ampullae; less than 211μ, 211–260μ and more than 260μ. It is then possible to separate the mosquitoes into (1) those feeding for the first time, 1–2 days old; (2) those feeding for the second time, not yet having laid eggs, 2–4 days old; (3) those that have already laid eggs at least once, more than 4–5 days old; and (4) a small indeterminate group usually about 3–5% of the total.

The numbers of *A. gambiae* caught in untreated shelters in South Pare in January, February and April were only a quarter of those caught before dieldrin spraying; but the number of emerging adults was less affected. The incidence of the youngest age-group doubled after spraying. The effect of the insecticide in house-haunting mosquitoes persisted until the second application in May. Though *A. funestus* has nearly disappeared the density of *A. rivulorum* has increased.

Mr. M. G. Christie, reporting on the survival of anopheline larvae, notes that of all predators the Notonectidae seemed to be most important in his experiments with *A. gambiae* larvae. The fate of larvae in large expanses of water and of stranded eggs is still to be studied.

Dr. A. Smith presents a mass of data in tables and graphs which show that after huts were sprayed with dieldrin the following observations could be made:—*A. funestus* almost disappeared but some *A. gambiae* lingered on; few if any of the *funestus* group caught in outdoor shelters were true *A. funestus*; no females were infected; *A. funestus* and *A. gambiae* on human bait both decreased but the numbers of *A. rivulorum* increased; culicines in houses in South Pare were reduced by 80% but in Taveta they increased by 400%.

Dr. C. C. Draper's malariometic data suggest that malaria transmission has already diminished. A census of the population is being made and a physical assessment of the people is gradually being built up. Workers with dieldrin were medically examined and during a spraying

cycle of 5 months there were no nervous symptoms but among 12 men there were 3 cases of bronchitis and 8 others complained of chest symptoms.

Drs. T. E. Fletcher and J. M. Press tested a new method of analysis to enable a rapid and accurate estimation of dieldrin to be made at the microgramme level. At present accuracy is 20 to 40 microgrammes but it has still to be tried for estimations required by field workers.

Mr. A. S. Msangi is enquiring into the toxicity of dieldrin vapour. In a preliminary experiment the vapour killed a large number of female *A. gambiae* in 24 hours and all were dead in 48 hours.

Among other activities methods of artificially feeding female *A. gambiae* are being tried; observations are being made on 2 pools infested with *Physopsis globosa*; the average weekly catches of snails and their infection with *Schistosoma haematobium* to June 1956 are tabulated; an entomological assessment is being designed for a proposed residual spraying campaign in Zanzibar; a trial was made of aerial application of a granulated formulation of dieldrin in the Dar es Salaam area, the value of which has not yet been assessed; a film of cetyl alcohol on water had no effect on eggs, larvae or pupae of mosquitoes, nor had it any repellent effect on egg-laying females. It had, however, a retarding effect on the free spread of Malariol HS on water.

Some general remarks are made on a dietetic survey performed between May and November 1955. *H. S. Leeson*

Milovanović, M. & Popović, D. [**Malaria in Serbia from 1952 to 1956**] *Bull. Inst. Hyg.* Belgrade. 1957, v. 6, Nos. 1/2, 105–20. [11 refs.] [In Serbian.]

The English summary appended to the paper is as follows:—

"In 1952 only 10 cases of malaria were notified in Serbia, in 1953 the number of cases was 35, in 1954 the number of notified cases was higher, mounting to 195, whereas in 1955 and in 1956 there were 480 and 475 cases respectively.

"During this 5-years period there were 1,111 cases of malaria tertiana, 66 cases of tropica and 18 cases of malaria quartana.

"The highest number of patients came from Akmo, a minor part from county of Vranje; on the whole only sporadic cases were notified in the remaining territory of Serbia.

"From 1947 to 1952 in Serbia and in the whole of Yugoslavia a constant and evident decrease in malaria cases was observed. At that time a strong antimalaria service was established and residual DDT spraying was carried out, especially in the endemic and hyperendemic areas. In 1953–1954 period residual DDT spraying was reduced to a very few places. Due to this fact, an increase both in Serbia and Macedonia was observed.

"In 1955, the antimalaria service was reestablished, consisting of an active search for malaria patients, with a compulsory notification of malaria cases and with the microscopical diagnosis of each case. The surface covered by DDT residual spraying was enlarged."

Atkins, K. J. **Congenital Malaria.** [Correspondence.] *Brit. Med. J.* 1957, Aug. 3, 300.

The author, in Calabar, Nigeria, took blood films on the day of delivery from 50 consecutive Nigerian mothers and their infants: 32 of the mothers had positive films for *Plasmodium falciparum* and they had given birth to 22 infants with positive blood films. No mother with a negative blood film gave birth to a child with a positive film.

All the mothers had had free antenatal care and treatment. Only 4 had complained of fever at the antenatal clinic and they were treated; of these 4, 3 had negative blood films at delivery.

P. falciparum is hyperendemic in the area (74% of the people have positive blood films) so that the incidence of congenital malaria quoted is remarkably high. The author suggests the use of chemoprophylaxis against malaria during pregnancy. *H. J. O'D. Burke-Gaffney*

Raffaele, G. La fase esoeritrocitica in rapporto alla profilassi con i farmaci e alla incubazione della malaria. [**The Exoerythrocytic Phase in Relation to Drug Prophylaxis and Incubation Period of Malaria**] *Riv. di Malariologia.* 1956, Dec., v. 35, Nos. 4/6, 215–30. [44 refs.] English summary (9 lines).

The author draws attention to gaps in our knowledge regarding the effect of the tissue phase of development (EE stages) of human malaria parasites upon the course of infection and response to drugs. Thus, little is known about the role played by EE stages in the response to chemoprophylactic treatment, except that sporozoites and EF forms are resistant to drugs. According to the author, EE schizonts produce 2 types of merozoites (a) histotropic and (b) haemotropic, and the predominance of one or the other determines whether the tissue or blood respectively is invaded. Thus, in *Plasmodium falciparum* pre-erythrocytic schizogony presumably gives rise to haemotropic merozoites exclusively, whereas in *P. vivax* and *P. malariae* histotropic schizogony, which is responsible for the continuation of EE development, is succeeded by haemotropic schizogony, with merozoites invading the blood. Since only the blood parasites respond to prophylactic treatment, it would seem that the ease with which *P. falciparum* infections are suppressed is due to the short duration of histotropic schizogony, while the refractoriness of *P. vivax* malaria is due to its persistence. It is noted that in avian plasmodia the histotropic forms are represented by macromerozoites and the haemotropic by

micromerozoites, but in human parasites this dimorphism has not been observed, though its existence cannot be excluded.

As a rule the tendency to produce histotropic merozoites varies considerably in different strains, and in some cases of infection with *P. vivax* and *P. malariae* they may disappear, leaving only the haemotropic merozoites to invade the blood, whence they are readily eliminated by drugs, with the resulting cure. This view is supported by observations on avian malaria, in which the tropism of the EE merozoites could be changed experimentally.

Among the factors affecting the success of chemoprophylaxis, the author mentions the number of sporozoites inoculated, and notes that under experimental conditions high doses tend to produce in *P. gallinaceum* more histotropic forms. It is possible that the variable response of human patients to chemoprophylaxis may also be due to this factor. However, under natural conditions human beings are usually inoculated with moderate numbers of sporozoites which produce few EE forms, and—since these are mostly haemotropic—their suppression and elimination by drugs (*e.g.*, quinine) is usually effected with ease.

In considering the incubation period, the author observes that it is generally held that its length is in inverse proportion to the numbers of sporozoites inoculated. However, it had been demonstrated experimentally that even after inoculation of massive doses of sporozoites the incubation period of human malaria is not appreciably shorter than after the bite of a single infected mosquito. Numerous examples are quoted showing the great variability of the incubation period in human malaria (from a few days to several months in *P. vivax*). The author believes that this variation may be due to the fact that the haemotropic merozoites differ in their adaptability to an erythrocytic existence, owing to some physico-chemical peculiarities of the hosts' red blood corpuscles.

C. A. Hoare

Łukasiak, J. Występowanie *Anopheles bifurcatus* Meigen, 1818, (*Anopheles claviger*, Meig., 1804) na obszarze Warszawy. [**The Appearance of the *Anopheles* Mosquito in the Warsaw Area**] *Przegląd Epidemiol.* Warsaw. 1957, v. 11, No. 2, 123–30, 1 fig. [28 refs.]

The English summary appended to the paper is as follows:—

"During the period of 1952–1955 the author carried out investigations on the appearance of malaria carriers, particularly in house premises in Warsaw and vicinity. Among those carriers there was often found *Anopheles bifurcatus* [*claviger*].

"Winged forms of *A. bifurcatus* appeared in different house premises of Mokotów, Czerniaków, Służew and other districts.

"In cow sheds females of the mosquito were prevalent (78%). In cellars—males were found in 31%. The appearing of the females was observed in the first few days of May, the last female-mosquitos could be

noticed at the end of September and on the first days of October. So, the duration of their vegetation season is 154 days. During the spring and the autumn evidently more winged forms of the mosquito than in the summer, could be observed.

"The period of development of the larvae lasted 35 days. The author differentiates 3 periods of their appearing: the spring- and autumn- period with a numerous appearing and the summer period with a less numerous appearing of the larval forms. Those periods are in accordance with the number of generations of the winged forms in the year-development cycle of *Anopheles bifurcatus*."

Bixson, G. & Doucet, J. Action anti-palustre à Abidjan. Étude entomologique. Lutte antilarvaire. [**Malaria Control in Abidjan, Ivory Coast. Entomological Survey and Antilarval Measures**] *Méd. Trop.* Marseilles. 1957, May–June, v. 17, No. 3, 416–21, 1 map.

A survey was carried out in the neighbourhood of Abidjan on the Ivory Coast in which details of 3,339 breeding places were recorded. Anophelines were recovered from 879, and among those which were identified 92% were *Anopheles gambiae*, 6·7% *A. coustani*, 0·84% *A. gambiae* var. *melas*, and 0·28% *A. obscurus*. A list is given of the 7 other species previously recorded from the area. 43% of the breeding places of *A. gambiae* were in vegetable gardens and 45% were in swamps in the neighbourhood of the airfield. Recommendations for the improvement of larval control are given. *G. Macdonald*

Canning, Elizabeth U. **On the Occurrence of** *Plistophora culicis* **Weiser in** *Anopheles gambiae*. *Riv. di Malariologia*. 1957, June, v. 36, Nos. 1/3, 39–50, 30 figs. [11 refs.]

Bhatia, M. L., Wattal, B. L. & Mammen, M. L. **Preferenial Indoor Resting Habits of** *A. culicifacies* **Giles near Delhi.** *Indian J. Malariology*. 1957, Mar., v. 11, No. 1, 61–71, 1 map & 2 charts. [14 refs.]

A. culicifacies found resting inside human dwellings and cattlesheds in Kinauni, a village outside the control area near Delhi, were recorded from August 1954 to September 1956. The observations indicate that:—

"1. *A. culicifacies* prefers to rest on ceiling and cobwebs hanging from it than on any other structure inside a dwelling.

"2. 84·3 per cent *A. culicifacies* rest above four feet and on ceiling inside a shelter, and 76·9 per cent on ceiling and above six feet level from the floor.

"3. Of the four walls, the one with the door showed slightly higher

A. culicifacies density than any of the other three walls. The difference, however, does not seem to be of any great significance.

"4. Hanging objects, shelves and objects on floor, serve only as incidental resting places for this species.

"5. *A. culicifacies* avoids dark places like corners.

"6. Low illumination, slightly coarse surface, little or negligible air movement and median humidity may be the cause of high *A. culicifacies* density on ceiling and cobwebs hanging from it. In addition, this species shows marked negative geotropism.

"7. It is suggested that in Northern India in areas where *A. culicifacies* happens to be the only vector, a spray programme ensuring complete coverage of the ceiling and of the walls above three feet level from the floor, should control malaria transmission."

Pletsch, D. J., Tseng, P. T. & Chen, H. H. **Daytime Populations of Anophelines in Houses and Stables of Rural Taiwan (Formosa), China.** *J. Formosan Med. Ass.* 1956, Dec., v. 55, No. 12, 614–21.

In connexion with the island-wide antimalarial campaign with the use of DDT residual spraying in Taiwan (Formosa), observations were made of daytime populations of anopheline species in unsprayed houses and cow stables.

With the use of flashlights and suction tubes, all mosquitoes present in the houses and stables examined were collected, and identified. There were only 9 anopheline species collected in this survey; the 2 most important were *Anopheles minimus* and *A. hyrcanus sinensis*. The former were more frequently found in houses than in stables, with an island-wide house:stable ratio of 2·3:1. It was noticeable, however, that in the warm southern half of the island, south of the Tropic of Cancer, *A. minimus* was strongly house-haunting, while in the cooler northern half it was slightly more stable-haunting. *A. h. sinensis*, on the other hand, preferred stables to houses at an overall ratio of 20:1.

Anopheline densities in houses and stables were usually low. About 80% of the houses and stables examined yielded no anophelines or less than 10 specimens per collection. The highest density of *A. minimus* in a single house was 966 specimens and the largest number of *A. h. sinensis* in a single stable 5,740 specimens. Female anophelines were always more numerous than males. *W. Z. Coker*

Tseng, P. T., Chen, H. H. & Pletsch, D. J. **Daytime Resting Places of *Anopheles minimus* in Rural Houses of Taiwan (Formosa), China.** *J. Formosan Med. Ass.* 1956, Dec., v. 55, No. 12, 622–8.

In order that the island-wide antimalarial campaign with DDT-residual spraying in Taiwan (Formosa) might be effectively executed, the daytime

resting places of *Anopheles minimus* in houses were studied. In each house the bedroom, store-room, sitting room, kitchen, bathroom, toilet room and the " under eave " (outside surfaces of house) were examined.

It was found that bedroom units yielded an average of 5·57 specimens, closely followed by store-room units (4·05 specimens), sitting room units (2·47), kitchen units (1·40), bathroom (0·55), toilet room (0·19) and under eave (0·13). Bedrooms and store-rooms are more attractive resting places as these are well enclosed and less disturbed by the inhabitants in the daytime. The other places are more frequently occupied by the inmates, or are more or less exposed to the elements, and are not so well favoured by the mosquitoes.

Of 16 microhabitats in houses 4 showed the highest attractiveness to the female anophelines. These were (i) underneath bed, (ii) inside roof, (iii) underneath furniture, (iv) walls up to 1 metre high. In bedrooms (i) and (ii) were favoured, in sitting rooms (iii) and in kitchens (iv).

It is estimated that of the total number of the mosquitoes found in a house 14·68% rest on the surfaces of objects which are not treated with ordinary applications of residual insecticides.

It is suggested that in Taiwan, the examination of areas " underneath beds " will suffice for the sampling of an *A. minimus* population in human habitations. *W. Z. Coker*

Bruce-Chwatt, L. J. & Gibson, F. D. **Two Cases of Accidentally Induced Infections with *Plasmodium falciparum* in Non-Immunes in West Africa.** *J. Trop. Med. & Hyg.* 1957, Aug., v. 60, No. 8, 199–200, 1 fig.

A member of the staff of a research institute in Nigeria developed an acute febrile disease and scanty schizonts of *Plasmodium ovale* were found in a thick blood film. Treatment was withheld for 4 days with the intention of attempting to isolate this strain, but as the expected increase in parasitaemia did not develop and the patient had severe headaches, it was decided to transmit his infection to 2 volunteer members of the Malaria Service, the authors of this paper. Each stopped his usual daily dose of proguanil for 4 days and was then given 5 ml. of the donor's blood intravenously. The donor was then treated successfully with chloroquine.

One of the volunteers developed his first symptoms 7 days after infection, when his temperature rose to 104°F., and thereafter had a severe attack, which is described in detail, culminating on the 9th day with hyperpyrexia and mental confusion. In view of his condition it was decided to take 10 ml. of his blood for deep-freeze storage and to treat his infection as a matter of urgency. He responded rapidly to 3 intramuscular injections of 50 mgm. chloroquine at 20-minute intervals followed by daily oral doses of 600 mgm. for 5 days. Convalescence took 2 weeks. Blood films taken in his first and early in his second paroxysm were negative but 6 films taken later in the day of the second paroxysm

showed very scanty rings, probably of *P. falciparum*. The blood was then negative until the 13th day, when very scanty gametocytes of *P. falciparum* were found in 2 blood films.

The second volunteer developed headache, malaise and a temperature of 100° F. which soon fell on the 9th day. Blood films taken that day were negative. The symptoms disappeared next day, but on the 11th day there were a rigor, headache, vomiting and diarrhoea. The temperature rose to 104·2° F., then fell after a crisis. No parasites were found early in the paroxysm, but later in the evening numerous young rings of *P. falciparum* were found. The patient recovered uneventfully after oral chloroquine therapy, and the blood films remained negative thereafter, up to 1 month.

The authors make the following points: (1) Any malaria infection in West Africa might be mixed with *P. falciparum*, (2) an 11-day break in suppressive therapy was sufficient to allow a heavy *P. falciparum* infection to run its full course, (3) some severe *P. falciparum* infections may speedily involve the central nervous system, (4) parasitaemia in severe *P. falciparum* infections may be so low in the early stages that a positive laboratory report cannot always be expected, (5) treatment of severe *P. falciparum* infection must not wait for confirmation of diagnosis by a positive blood film. *H. J. O'D. Burke-Gaffney*

Coda, D. & Coda, M. de M. Os antimaláricos e seu emprêgo. [**Antimalarials and their Employment**] *Arquivos de Hig. e Saúde Pública.* S. Paulo. 1954, Sept., v. 19, No. 61, 111–40. [40 refs.]

The English summary appended to the paper is as follows:—

"The authors make an outline of the chief antimalarial drugs, their chemical compounds, synonymy, main salts, historical, absorption, elimination, action, toxicity, their use and doses both therapeutic, curative and prophylatic, causal and suppressive. At the end is shown a table of treatment which presents therapeutic doses of all antimalarial drugs described."

Snow, G. A. & Hurst, E. W. **Distribution of Mepacrine in the Organs of Different Animal Species, and in the Components of Liver Cells.** *Brit. J. Pharmacol. & Chemotherapy.* 1956, June, v. 11, No. 2, 209–14. [12 refs.]

Chechelnitskaya, S. M. & Baigulova, S. A. [**The Efficacy of Quinocide Administration in Treatment of Tertian Malaria**] *Med. Parasit. & Parasitic Dis.* Moscow. 1957, v. 26, No. 3, 268–9. [In Russian.]

The English summary appended to the paper is as follows:—

"1) Treatment by quinocide [this *Bulletin*, 1956, v. 53, 17] is 5 times more effective than the usual methods of therapy.

"2) Patients who previously had malaria may be directed to the regions liberated from malaria after treatment by quinocide. In such cases there is no risk of introduction of malaria into these regions.

"3) Treatment by quinocide makes the following chemoprophylaxis and anti-relapse treatment unnecessary. This facilitates the work of the district medical personnel."

Tiburskaya, P. A. [**In Search of Methods of Radical Chemo-Prophylaxis and Nonrelapse Treatment of Tertian Malaria with Short and Long Incubation**] *Med. Parasit. & Parasitic Dis.* Moscow. 1957, v. 26. No. 3, 264–7, 1 chart. [In Russian.]

The English summary appended to the paper is as follows:—

"1. Quinocide was prescribed to 12 patients for 10 days in the dose of 0·03 per day. This treatment was introduced during incubation period after the bite of mosquitoes, infected by the strain of tertian malaria with long incubation. It was established that the above mentioned treatment prevents malaria, independently of the time of administration of quinocide, beginning from the second month up to the 9½ months since the date of infection.

"2. Thus, quinocide may be prescribed during incubation period for radical chemoprophylaxis of tertian malaria with long incubation period."

Pinotti, M. & Soares, R. A erradicação da malária com o sal cloroquinado. [**Eradication of Malaria with a Mixture of Chloroquine and Common Salt**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Jan., v. 8, No. 1, 253–65. [10 refs.] English summary.

See this *Bulletin*, 1956, v. 53, 853 *bis*.

Pampana, E. J. L'éradication du paludisme. [**The Eradication of Malaria**] *Riv. di Malariologia.* 1957, June, v. 36, Nos. 1/3, 1–21. [10 refs.] English summary.

Ciuca, M. **The Eradication of Malaria, the Present Stage of Antipaludian Action in the R.P.R. within the Vast Complex of this Problem extended to a Worldwide Level.** *Rumanian Med. Rev.* 1957, Jan.–Mar., v. 1, No. 1, 27–37. [13 refs.] [Also in *Microbiol., Parazitol. si Epidemiol.* 1956, No. 2.]

The author reviews the concept and mechanisms of eradication of malaria as they might apply to the special circumstances of Rumania which has now for several years practised extensive imagicidal control

[this *Bulletin*, 1957, v. 54, 778], reducing the number of known cases to 222 in 1955 when 86,582 films were examined for various reasons. No anopheline resistance has been recorded though it might occur, and experience shows that eradication is practicable in Rumania because it has been achieved in three areas with a total population of 76,180 while re-invasion of other incompletely cleared areas has been shown to be slow. Principles for eradication are set out with strong emphasis on the importance of surveillance and on the watch for resistance.

G. Macdonald

Livadas, G. **Malaria Vector Resistance to Insecticides.** *Riv. di Malariologia.* 1957, June, v. 36, Nos. 1/3, 23–38. [44 refs.]

[A good review of the situation in Greece.]

Sharma, M. L. D. & Krishnamurthy, B. S. **Effectiveness of Diazinon-Residual Spray on DDT Resistant *A. subpictus* in a Village in Delhi State.** [Research Notes.] *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, May, v. 5, No. 3, 200–201.

DDT at 100 mgm./sq. ft. was not effective, but diazinon at 25 mgm./sq. ft. was effective against the DDT-resistant *A. subpictus* for about 3 weeks.

Garnham, P. C. C., Lainson, R. & Gunders, A. E. **Some Observations on Malaria Parasites in a Chimpanzee, with particular reference to the Persistence of *Plasmodium reichenowi* and *Plasmodium vivax*.** *Ann. Soc. Belge de Méd. Trop.* 1956, Dec. 31, v. 36, No. 6, 811–21, 2 figs. (1 on pl). [15 refs.]

The authors describe observations and experiments on natural and induced malarial infections in a chimpanzee obtained from Liberia.

When received in England the ape was infected with *Plasmodium schwetzi* (the *P. vivax*-like parasite) and *P. reichenowi* (the *P. falciparum*-like parasite), rings and gametocytes of which persisted in the blood for about 5 months, when the animal was treated with drugs and showed no parasites during the following 17 months, after which it was inoculated with human blood containing large numbers of *P. malariae* and scanty *P. vivax*.

However, in the case of *P. reichenowi* chemotherapy failed to remove the infection, for this parasite reappeared in the blood of the chimpanzee after splenectomy carried out 2½ years after the initial infection had been observed. It was thus evident that in *P. reichenowi*—in contrast to the allied *P. falciparum*—exo-erythrocytic schizogony persisted beyond the pre-erythrocytic phase.

In the course of this relapse, schizogony was found to take place in the peripheral blood and the development of gametocytes was observed for the first time. It differed from that in *P. falciparum* in the absence of spindle forms and intracorpuscular inclusions and in the presence of rod-like pigment. [An illustration is given of various stages of development of this parasite.]

The development of the human parasites proceeded as follows in the chimpanzee. In the case of *P. vivax*, a high degree of parasitaemia persisted for about 3 months and parasites were present 4 months longer. In the course of the infection various stages of development were seen, including gametocytes. Mosquitoes (*Anopheles stephensi*) were successfully infected from the ape and the infection was transmitted cyclically to one of the authors, producing a typical attack of BT malaria. In the case of *P. malariae*, parasitaemia increased progressively for 2 months, when quinine was administered, and afterwards the infection ran a mild course, with recrudescences. Gametocytes were scarce and failed to infect mosquitoes (*Anopheles* spp.). *C. A. Hoare*

Misra, B. G. & Nair, C. P. **Stability of Proguanil Resistance in** *P. knowlesi*. [Research Notes.] *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, May, v. 5, No. 3, 202–4, 1 chart.

Kuan-Wei-Bin. [**The Study of Acquired Resistance of** *Plasmodium gallinaceum* **to Dichroin-γ**] *Med. Parasit. & Parasitic Dis. Moscow.* 1957, v. 26, No. 3, 269–77. [Numerous refs.] [In Russian.]

The English summary appended to the paper is as follows:—

"1. Dichroin has a pronounced effect against P. gallinaceum. If administered to chicks for 3–4 days in the dose of 0·005 mg. per 20 gm of body weight, the first dose being given directly after infection it produces a pronounced reduction of the number of parasites in the blood in comparison with the control group.

"2. For 5 months fresh chicks were reinfected every 5–8 days by a strain of P. gallinaceum. At the same time dichroin was administered daily. It was found that the strain of P. gallinaceum after this experiment was about 8 times more resistant to the preparation than the original one.

"3. After a 4 months interval in administration of dichroin—the acquired resistance of the P. gallinaceum strain was preserved on the same level. Resistance was found to be present, likewise after an interval of 5½ months, but its degree was not verified.

"4. It was not possible to check, whether the resistance would become higher with increased doses of the preparation since the chicks were unable to tolerate higher doses."

Corradetti, A. & Neri, Italia. *Plasmodium subpraecox* Grassi e Feletti 1892 ceppo di *Plasmodium praecox* Grassi e Feletti 1890 adattato a vivere nella civetta *Carine noctua*. [*Plasmodium subpraecox* **Grassi and Feletti 1892. A Strain of** *Plasmodium praecox* **Grassi and Feletti 1890 adapted to live in the Screech-Owl** *Carine noctua*] *Rendiconti Istituto Superiore di Sanità*. Rome. 1957, v. 20, Pt. 3, 230–34.

The English summary appended to the paper is as follows:—

"It has been shown that *P. subpraecox* is a strain of *P. praecox* adapted to live in the owl. The adaptation is not perfect as the parasite experiences greater difficulty in its development in the screech owl than in the canary."

Baker, J. R. **A New Vector of** *Haemoproteus columbae* **in England.** *J. Protozoology*. Utica. 1957, Aug., v. 4, No. 3, 204–8, 5 figs. [16 refs.]

"*Haemoproteus columbae* of English wood pigeons (*Columba palumbus palumbus* L.) was found to undergo sporogony in *Ornithomyia avicularia*. It is suggested that this insect is a vector of *H. columbae*, in spite of the failure of six attempts to transmit the haemosporidian to uninfected domestic pigeons (*C. livia* var. *domestica*) by the bite, or injection, of infected *O. avicularia*."

TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—*African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:— epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Burnett, G. F. **The Relation between Age and Cold Resistance in Tsetse Flies and the Value of chilling when transporting Tsetse for Experiments.** *Proc. Roy. Entom. Soc. of London*. Ser. A. 1957, June 28, v. 32, Pts. 4/6, 53–8.

G. palpalis fuscipes of ages varying between 1 and 16 days were exposed for periods of 1 to 4 hours to low temperatures between 1·5° and 10°C. Then the numbers found dead in each subsequent 24 hours were recorded.

The tests showed that there is a progressive and rapid loss of resistance to cold with increasing age in both sexes. Teneral flies were unaffected by the most rigorous treatment, but 7-day-old flies lost 58% of their numbers within 2 days of exposure; 10-day-old flies were reduced by 63% in 1 day and 2-week-old flies were all dead in a day although they had been exposed for only 1 hour instead of 3. Cooling to 9° to 10°C. for 3 hours had no deleterious effect on viability up to 16 days.

Male wild-caught non-teneral *G. morsitans* were confined at temperatures ranging from 2° to 10°C. for periods of 10 minutes to 6 hours, and then released at dusk into a cage. At dawn the dead flies were removed and survivors killed. The ages of those exposed for 1 and 2 hours at 2°C. were calculated from the " mean wing fray ".

Mortalities increased with depression of temperature and time of exposure and the mean age of the dead was 33 days and of the survivors 18 days. The same tendency was observed with female *G. morsitans* and male *G. swynnertoni* though the numbers used were much smaller.

Some of the points emerging from this investigation are: old flies of both sexes are more susceptible to cold than young ones; there is no evidence of digestive failure; the use of chilling as a method of transporting tsetse cannot be recommended for experiments which depend on normal survival and behaviour of flies after release. Finally, these findings may reconcile conflicting reports on the effect of cold on tsetse, since different investigators may have used flies of different ages.

[See also Potts, this *Bulletin*, 1934, v. 31, 65.] *H. S. Leeson*

Gall, D., Hutchinson, M. P. & Yates, W. **The Erythrocyte Sedimentation Rate in Sleeping Sickness.** *Ann. Trop. Med. & Parasit.* 1957, June, v. 51, No. 2, 136–50, 5 figs. [Numerous refs.]

It is common knowledge that the erythrocyte sedimentation rate [ESR] is high in patients suffering from trypanosomiasis, but there are also other causes for a high ESR in Africans. Studies by various workers suggest that the ESR is particularly high in virulent cases of the disease during its febrile periods.

The authors found the Westergren method more sensitive and less prone to error than the Wintrobe for the determination of the ESR. They found that a delay of 5 hours after taking blood had a negligible effect on the determination. The sedimentation readings, where possible, were taken at 10-minute intervals; but for practical purposes the 30-minute and 60-minute readings suffice. No correction was made for the anaemia usual in sleeping sickness patients. Determination of the ESR in series of rural and of urban control patients gave a median one-hour rate of sedimentation of 15 to 76 mm. In 377 parasitically positive untreated cases of sleeping sickness (*Trypanosoma gambiense*) in Nigeria the sedimentation rates were strikingly high; the median one-hour rate was 114 mm. Such a figure would normally be associated with extensive tissue destruction, with advanced malignant disease, or with blood-protein changes as in myelomatosis. Marked blood-protein changes were shown to occur with trypanosomal infection. The ESR rises early in the disease, and thereafter falls somewhat as the disease progresses with increasing changes in the cerebrospinal fluid. During treatment, with Melarsen or with Antrypol and tryparsamide, the ESR soon falls to half its initial value, and during the next year continues to fall to about a quarter of

the maximum; it is then within the range of normal as judged by the control group. Relapse of the disease after treatment is not associated with a further rise in the ESR, and repetition of the treatment does not again alter the ESR.

The increase in the ESR is closely associated with the red-cell clumping evident in trypanosomiasis. This has been called " auto-agglutination ", but the term " pseudagglutination " is better because the plasma in these cases agglutinates red cells other than its own. The main plasma change found in association with high red cell agglutinability in trypanosomiasis is a very high serum gamma globulin level. This appears to be the most potent single cause of the raised ESR in sleeping sickness; conversely, the ESR affords a rough indication of the gamma globulin response to the infection.

[See also this *Bulletin*, 1948, v. 45, 1070.] *A. R. D. Adams*

Hyde-Wyatt, B. **The Control of an Isolated Tsetse Population.** *West African Med. J.* 1957, June, v. 6 (n.s.), No. 2, 68–9.

For various reasons the clearing of vegetation as a tsetse control measure cannot be applied to the station garden of just over 5 acres at Wa, Ghana; therefore DDT was tried.

Eventually, ½ lb. DDT per 4 gallons of water was applied at approximately 8 gallons per acre, 4 times between 30th October and 17th December 1956.

The weekly fly round showed an immediate reduction in the number of *Glossina tachinoides* and catches to February 1957 remain low. *G. palpalis* has appeared occasionally as a casual introduction.

For such small isolated areas DDT seems to be satisfactory and safe.

H. S. Leeson

Burnett, G. F., Robinson, J. & Le Roux, J. G. **Comparative Trials of D.D.T. and Dieldrin for the Control of the Riverside Tsetse** *Glossina palpalis fuscipes* **(Newst.).** *East African Agric. J.* 1957, Jan., v. 22, No. 3, 142–6, 2 figs.

In these tests Shell Arkotine containing a coumarone resin was diluted with water to give a 5% DDT emulsion. Dieldrex 15 which contains no resin was used at 2 dilutions: (a) 1·7% dieldrin and (b) 5% dieldrin. The 3 emulsions were applied to vegetation at the rate of 15 gallons per mile of river bank.

At intervals of some days random leaf samples were taken from the treated bushes and contact tests lasting 15 seconds were made with living *Glossina palpalis fuscipes*. Other flies were walked over clean surfaces as controls. Results are summarized in a table.

The laboratory tests showed that the DDT had lost half its effectiveness in a week, but success in the field suggests that either the kill within

2 or 3 days approached completeness or the DDT is more persistent than the tests indicate. Chemical estimates (summarized in another table) of the mean deposits on 100 leaves in mgm. per square foot showed that the initial deposit of DDT was 27·6, about two-thirds of that of 5% dieldrin (41·6) though it was expected to be about the same. Both of these were expected to be about 3 times as heavy as the 1·7% dieldrin deposit whereas the DDT was 2·6 times and the 5% dieldrin was 3·9 times as heavy.

In the field there was rapid loss of DDT in the first 3 days and very few crystals were seen after 12 days though the varnish remained; but there was no apparent change in the dieldrin deposit after 3½ weeks. Rain made little difference but violent winds caused dislodgment of crystals of DDT while those of dieldrin remained attached. After 8 weeks and much rain DDT was obvious as a white bloom, but there was no trace of the insecticide under the microscope. Dieldrin seemed unchanged but many light deposits must have been removed. It is possible also that there was some reduction in effectiveness due to dust.

Under milder conditions the DDT might have lasted longer and probably both insecticides persist better on twigs but these were not investigated.

However, it seems that if the DDT is applied at short enough intervals and it remains lethal for 2 or 3 days it may be sufficient to kill nearly all the flies present at the time of spraying and those emerging later would be caught by the next spraying before they could breed.

One application of 1·7% dieldrin lasts at least 3 weeks longer than one of 5% DDT, and 2 sprayings of 1·7% dieldrin 5 weeks apart are as effective as 4 sprayings of 5% DDT 2 weeks apart giving a total lethal period of 7 weeks, and 1 application of 5% dieldrin might be as effective as 2 of the 1·7% emulsion.

Time, labour and money would be saved if either of the dieldrin routines were adopted rather than the 4 applications of 5% DDT, and the single application of 5% dieldrin has much to recommend it.

However, another routine, with 4 treatments of DDT at intervals of 3 weeks instead of 2 weeks, thus extending the period covered from 7 to 10 weeks, remains to be tested in the field. *H. S. Leeson*

Larviere, M. Etude de l'infection expérimentale à *Trypanosoma gambiense* du *Cricetomys gambianus*. Note préliminaire. [**Experimental Infection of** *Cricetomys gambianus* **with** *Trypanosoma gambiense*.] *Bull. Méd. de l'Afrique Occidentale Française*. (n.s.) 1957, v. 2, No. 1, 122–5.

The English summary appended to the paper is as follows:—

"Inoculation of Cricetomys gambianus with Trypanosoma gambiense strain directly isolated from a human, determined immediately at the eighth passage a regular infection, constantly lethal for animal."

Terry, R. J. **Antibody against *Trypanosoma vivax* present in Normal Cotton Rat Serum.** *Exper. Parasit.* New York. 1957, July, v. 6, No. 4, 404–11, 1 fig.

"1. Normal cotton rats are completely resistant to infection with a strain of *Trypanosoma vivax*. This resistance appears to be wholly or largely due to a factor present in the serum in low titre which agglutinates and lyses the trypanosomes.

"2. This factor appears to be specifically directed against *T. vivax*. Five other species of trypanosomes were not affected by cotton rat serum. *T. vivax* was not affected by any of the other mammalian sera tested against it.

"3. The physical properties of the anti-*vivax* factor are consistent with its being a protein; electrophoretic separation of cotton rat serum indicates that the factor is associated with the β- and the faster-moving γ-globulins.

"4. The evidence available at the present time supports the idea that this factor is a serum globulin produced by the antibody-forming apparatus without there being any external stimulus. The fortuitous construction of this globulin is such that it reacts with *T. vivax* antigen."

Roubaud, E. Incidence des facteurs extérieurs sur les infections cycliques des glossines par *Trypanosoma cazalboui* (*vivax*). [**Incidence of External Factors on Cyclical Infection of Tsetse Flies by *Trypanosoma vivax***] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 35–9.

The author discusses the conclusions reached by Fairbairn and Watson [this *Bulletin*, 1956, v. 53, 160] as to the relation between temperature and the percentage of infection of *Glossina palpalis* by *Trypanosoma vivax*. He suggests caution in applying these conclusions too generally to *G. palpalis* since its subspecies show differences in their biological reactions including their relation to temperature. He also stresses the possibility that relative humidity may play a part in determining rate of infection. He supports these views by comparisons with previous work of his own and his colleagues [*ibid.*, 1936, v. 33, 180; *Sleeping Sickness Bureau Bull.*, 1911, v. 3, 27; *Bull. Soc. Path. Exot.*, 1952, v. 45, 206, 228] and by some recent observations made during the hot dry and cool wet seasons in Middle Dahomey; these were based on 3 batches of *G. palpalis* of 22, 25, and 15 flies respectively. *W. H. Potts*

Kraneveld, F. C. & Mansjoer, M. Onderzoekingen over de gevoeligheid voor surra. II. Het verloop der ziekte bij enkele in het wild levende dieren in Indonesië. [**Experiments on the Susceptibility for Surra. II. The Progress of the Disease in some Animals in Indonesia, living in a Wild State**] Reprinted from *Hemera Zoa*. 1952, v. 59, Nos. 3/4, 117–46, 7 graphs & 1 fig. English summary.

da Silva, L. H. P., de Carvalho, S. B. & Carneiro, Maria N. R. Doença de Chagas na Paraíba. Inquérito sorológico preliminar. [**Preliminary Serological Survey of Chagas's Disease in Paraíba, Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Jan., v. 8, No. 1, 281–8, 2 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"The authors made a preliminary serological survey on Chagas' disease among 1,468 persons from 7 counties of the State of Paraíba, Brazil. Complement-fixation test by Freitas and Almeida's quantitative technic was the method used. The sample included residents from 4 different physiogeographical zones and the results were studied according to this factor. The positive tests were thus distributed: Zone 2 (Ingá and Itabaiana counties)—0·4%; Zone 3 (Bananeiras and Solânea counties)—1·0%; Zone 5 (Taperoá)—11·4% and Zone 7 (Patos and Cajazeiras)—12·4%.

"Comparing these results with known data about the distribution of triatomid bugs and their infection with *Trypanosoma cruzi* the authors conclude that the backland areas with semi-arid climate of Paraíba are important foci of Chagas' disease. On the other hand this trypanosomiasis has, probably, a sporadic incidence on the coastal zones, although conditions seem adequate for the transmission of the disease."

Rubio, Mafalda. Actividad lítica de sueros normales sobre formas de cultivo y sanguíneas de *Trypanosoma cruzi*. [**Lytic Effect of Normal Sera upon Blood and Culture Stages of** *Trypanosoma cruzi*] *Bol. Chileno de Parasit.* 1956, Oct.–Dec., v. 11, No. 4, 62–9, 2 figs. [21 refs.] English summary.

The author studied the effect of normal sera upon *Trypanosoma cruzi* in cultures and in the blood. For this purpose, washed suspensions containing from 1 thousand to 10 million flagellates were exposed for periods up to 24 hours at 4°, 24° and 37·5°C. to undiluted and diluted (1:2, 1:4, 1:10) fresh or inactivated sera of the following animals: man, sheep, rat, mouse, guineapig, hamster, fowl, pigeon, toad and frog.

The results were as follows:— All the sera, except murine, destroyed by lysis and independently of the temperature the crithidial forms of cultures. When allowed to stand for a long time at room temperature or heated at 56°C. for 10 minutes, the sera lost their lytic action, though the natural absence of complement in some sera (*e.g.*, ovine) did not effect their lytic action. The lytic action could be recovered in some inactivated sera by addition of fresh mouse serum. As regards the trypanosome forms (both from culture and blood), they were destroyed only by the amphibian and avian sera, which—as in the case of the mammalian sera—lost their lytic action after inactivation by heat or when kept at room temperature. However, this activity could not be recovered by addition of fresh serum.

[See also this *Bulletin*, 1957, v. 54, 405.] *C. A. Hoare*

Pellegrino, J., Brener, Z. & Jacomo, R. A reação de precipitina na fase aguda da doença de Chagas. [**The Precipitin Test in the Acute Stage of Chagas's Disease**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Jan., v. 8, No. 1, 247–52.

The English summary appended to the paper is as follows:—

"The precipitin test with a polysaccharide fraction isolated from culture forms of *Schizotrypanum cruzi* (Fuller's method) was performed in 48 patients with acute Chagas' disease. The test was positive in 47 cases.

"The test was also performed in 48 chronic cases of Chagas' disease. Only 8 patients (16·6%) reacted positively.

"The importance of the precipitin test as an auxiliary method for diagnosis and as a means for screening recent cases of Chagas' disease was emphasized."

Schenone, H. & Niedmann, G. Nuevos aportes al estudio de la cardiopatía chagásica crónica en Chile. [**Further Contributions to the Study of Chronic Chagasic Cardiopathy in Chile**] *Bol. Chileno de Parasit.* 1957, Jan.–Mar., v. 12, No. 1, 2–7. [25 refs.]

The English summary appended to the paper is as follows:—

"1.—Clinical and electrocardiographic controls were made in a group of 240 human cases of chronic *Trypanosoma cruzi* infection, as compared with another group of 129 non-infected, apparently healthy persons. Both groups were from the northern and central rural areas of the country and had been similarly studied in 1951–52.

"2.—Clinical manifestations, such as palpitation, precordial pain, dizziness, syncope and/or vertigo, discrete congestive heart failure, bradycardia, and hypotension were present in a higher proportion in the infected group, as compared with the 1951–52 survey. No such symptoms were present in the control group.

"3.—Insofar as electrocardiographic alterations are concerned, no significant quantitative differences were observed between both groups. However, electrocardiographic alterations were slightly more common and severe in the infected group.

"4.—The results obtained are in good agreement with the 1951–52 findings and are a further confirmation of the benignity of Chagas' disease in Chile."

Reichenow, E. Über *Trypanosoma rangeli* und die Entwicklung des Blutparasitismus der Säugetiertrypanosomen. [*Trypanosoma rangeli* **and the Development of Blood Parasitism in Mammalian Trypanosomes**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 219–24, 2 figs.

In this paper the author traces the development of blood parasitism in mammalian trypanosomes. The early stages of this evolution are

exemplified in *Trypanosoma rangeli* and *T. conorhini*, both of which are primarily parasites of triatomid bugs, in which they produce cyst-like forms that serve to transmit the infection from insect to insect. Occasionally these flagellates are also able to infect mammalian hosts, in which they set up a low-grade infection, which is usually detectable only in thick blood films or by xenodiagnosis. These two species have many features in common with the Herpetomonads of non-blood sucking insects, in which both cysts and trypanosome forms are present, but, being parasites of blood sucking insects, they were able to establish themselves —though precariously—in the blood of vertebrate hosts, while retaining the essential characteristics of insect flagellates. The lack of adaptation of these trypanosomes to life in the vertebrate host is reflected in their inability to multiply in its blood. Another parasite of this type is the sheep trypanosome *T. melophagium*.

The next step in the adaptation to the vertebrate host is reached by trypanosomes (*e.g.*, *T. cruzi* and bat trypanosomes) which though unable to develop in the blood, multiply in the host's tissues. Further advances were made by trypanosomes which reproduce in the blood: first, discontinuously in the crithidial stage (*e.g.*, *T. lewisi*, *T. theileri*) and later, continuously in the trypanosome stage (pathogenic African trypanosomes). However, in both these groups the course of parasitaemia can be inhibited by trypanocidal antibodies. Finally, certain trypanosomes had become emancipated from their intermediate hosts and are transmitted mechanically (*e.g.*, *T. evansi*, *T. equiperdum*). *C. A. Hoare*

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Izzo, G. Osservazioni sulla leishmaniosi viscerale dei bambini nelle Province di Napoli e della Campania. [**Kala Azar in Children in the provinces of Naples and Campania**] *Acta Med. Italica*. 1957, May, v. 12, No. 5, 128–37. [Numerous refs.]

The author points out first that while kala azar elsewhere affects adults and children almost equally, the visceral leishmaniasis of the Mediterranean basin attacks children, especially those aged 2–5 years, though it is not exceptional in infants or children up to 10 years of age. Adults are rarely attacked.

After a description of the aetiology and histopathology he deals with the yet unresolved question of transmission (a) by means of the dog tick *Rhipicephalus sanguineus*, (b) by the digestive tract without intermediate host, (c) by *Phlebotomus* spp. The clinical picture, haematology and diagnosis are then discussed and he points out that in children puncture

of the bone-marrow is preferable for the demonstration of the organism, splenic puncture being resorted to only when this is negative. For serum tests he prefers that of Auricchio-Chieffi but emphasizes that even then it is only a presumptive test.

The author then proceeds to consider a clinico-epidemiological investigation at the Paediatric Clinic of the University of Naples, where an out-patient section especially for the diagnosis and treatment of infantile leishmaniasis has been set up, receiving patients from the province of Naples, Campania, and parts of Calabria and Molise. From the figures previous to 1948 an average of 50 patients per year were treated and his statistics deal with 240 treated at the clinic from 1948 to the present day. Of these 176 were treated as out-patients and 64 admitted to hospital. 90% of the cases came from the communes round Vesuvius, especially Torre Annunziata which is the endemic focus. Most of the children had contacts with dogs, and those between 2 and 3 years of age were most affected. 1 patient was only 3 months old. In view of the special intensity of cases round Vesuvius he implicates *Phlebotomus vesuvianus* as the vector. Mortality was 2%. Both sexes were affected equally, and though a somewhat larger number appeared to occur towards the end of the summer, in reality the children were attacked at all times of the year. The incubation period was uncertain but the Auricchio-Chieffi test was + in all cases.

Treatment was by 1% aqueous solution of antimony tartrate twice weekly into the jugular vein, first a dose of 0·5 cc., then 1 cc., treatment being carried on for 4–5 months, supportive treatment such as transfusion, liver extracts, and vitamins C, K, and B being given where necessary. The antimony was well tolerated in every case, neither intolerance nor toxic manifestations being found. All the patients were cured after a maximum of 5 months' treatment, the sole contra-indication to the drug being nephritis. No relapses occurred.

For prophylaxis the author suggests the use of nets with a mesh fine enough to exclude *Phlebotomus*, and the use of DDT, or other insecticides such as Octachlor. *W. K. Dunscombe*

de Alencar, J. E., Holanda, D. & Cavalcante, J. D. N. Calazar no Vale do Jaguaribe, Ceará, 1955. [**Kala Azar in the Jaguaribe River Valley, Ceará, Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Jan., v. 8, No. 1, 33–47, 2 maps & 2 graphs.

The English summary appended to the paper is as follows:—

" The authors state that along the Jaguaribe River valley, in the State of Ceará, Brazil, important foci of visceral leishmaniasis occur in Russas and Jaguaruana Counties, where they found a morbidity rate of 62 per 100,000 habitants.

" In other counties (Aracati, Limoeiro do Norte and Morada Nova) in the valley the disease is sporadic.

"Canine leishmaniasis also occurs, being more common in this region than elsewhere in the State.

"Cases are most prevalent where phlebotomi occur in large densities.

"According to their findings the authors suggest house spraying with DDT and elimination of sick dogs as measures for the control of Kala-azar in the area."

PANI, A. La più semplice siero-reazione per la diagnosi di Kala-Azar. Modifica alla reazione di Brahmachari e studio comparativo sul valore pratico delle reazioni più comuni. [**The Most Simple Serum Test for the Diagnosis of Kala Azar. Modification of Brahmachari's Test and Comparative Study of the Practical Value of the Most Common Tests**] *Acta Med. Italica.* 1957, May, v. 12, No. 5, 121–8, 2 graphs. [25 refs.]

The author, who works in the department of General Medicine of the United Hospitals of Reggio, Calabria (Southern Italy), puts forward a modification of Brahmachari's method claiming that because no special apparatus is needed the test can easily be performed at the patient's bedside. He points out, however, that all the tests in general use for the diagnosis of kala azar depend upon the alteration of the serum protein fractions, especially the albumin/globulin ratio, and that consequently a certain period of time must elapse after the actual commencement of the disease before any serum tests become positive, and also that a certain period must elapse before the altered protein picture becomes normal after clinical cure.

His test is carried out as follows:— 1–2 drops of serum are dropped into a small test tube containing distilled water. If the reaction is positive an obvious whitish cloud forms which sinks slowly and finally causes a general turbidity of the liquid. If negative the drop or drops of serum descend slowly and diffuse through the water and the mixture is transparent like glass. The positive reactions must be very obvious and immediate. Reactions can be read by looking at a window and shading the tube with the hand. Only a minimum of laboratory experience is necessary and it can be used as a preliminary test also. The author then compares his test with the 5 others in general use in 43 patients. Only his and the Auricchio-Chieffi test [this *Bulletin*, 1935, v. 32, 86] gave positive results in all; however, the Auricchio-Chieffi test is more complicated, it requires special apparatus, and also a solution of peptonate of iron which has to be made up fresh fairly frequently. The Brahmachari test gave 10 doubtful and 33 positive results.

In order to discover when all 5 types of test, and his own test, became positive and at what stage they became negative again after clinical cure, 5 patients were given these tests every 5 days until they became positive. A 2nd group of 5 patients were tested every 10 days till they became negative. The earliest date at which any test became positive was the

25th day. The author's (P), the Brahmachari (B), and the Auricchio-Chieffi tests were practically equal in sensitivity, the Castellani, Napier, and Chopra-Gupta were not so sensitive. In the tests to determine return to normal the P, B, and Auricchio-Chieffi remained positive longer in general than the other 3. 1 patient remained positive for more than 110 days from the commencement of treatment (with Stibional), and was then lost to view. The same tests were carried out on patients with other diseases involving fever, anaemia and splenomegaly, and a positive result to all was given by 1 patient with Cooley's disease (thalassaemia); some positive results were also obtained in hepatic cirrhosis.

The author concludes that his reaction is always positive in the acute phase of kala azar, that its great advantage is its simplicity and ease of reading, but that like all the other serum tests it is non-specific. He suggests that on account of its simplicity it should be generally used in the diagnosis of kala azar. *W. K. Dunscombe*

See also p. 1365. Kirk, **The Pathogenesis of some Tropical Splenomegalies.**

Herrer, A. Antiguedad de la leishmaniasis tegumentaria en América. [**Antiquity of Cutaneous Leishmaniasis in America**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Jan., v. 8, No. 1, 187–95, 1 folding map & 16 figs. on 2 pls. [17 refs.]

The English summary appended to the paper is as follows:—

"1. The author discusses the hypothesis that the mutilations shown in anthropomorphic ceramic ('huacos') from certain Peruvian pre-Colombian ruins would represent 'uta' (cutaneous leishmaniasis) lesions. Some pictures of 'huacos' which have been published by several authors with the purpose of comparing their mutilations with modern cases of 'uta' are reproduced, side by side, with photographs of these cases.

"2. Since endemic occurrence of 'uta' in various Peruvian provinces was accurately recorded as early as 1764, it is concluded that this form of leishmaniasis must be very old in the country. The author stresses the value of such historical records as an indication of the antiquity of the disease in Peru. A brief description is made of the topographical characteristics of the areas which are now endemic and which are indicated in a map."

Forattini, O. P. & Dos Santos, M. R. Nota sôbre um foco de Leishmaniose Tegumentar Americana no Estado de Mato Grosso, Brasil. [**Focus of Cutaneous Leishmaniasis in Mato Grosso, Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Jan., v. 8, No. 1, 127–33, 14 figs.

The English summary appended to the paper is as follows:—

"The authors relate the finding of a Cutaneous Leishmaniasis focus in

the State of Mato Grosso, Brazil. The authors found nine cases between the twenty two persons that were the local population. *Phlebotomus* collections were made and several species were found, in which *P. fischeri* and *P. longipalpis* are for the first time found in the State of Mato Grosso."

COUTINHO, J. O. Contribuição para o estudo da *Leishmania enriettii* Muniz e Medina, 1948—inoculações experimentais. [**Study of** *Leishmania enriettii*—**Experimental Infections**] *Folia Clin. et Biol.* S. Paulo. 1955, Apr.–June, v. 23, Nos. 4/6, 91–102. 4 graphs. [12 refs.]

Leishmania enriettii, which was isolated in Brazil from naturally infected guineapigs [this *Bulletin*, 1948, v. 45, 776], in which it causes a form of cutaneous leishmaniasis, has been maintained by the author in guineapig passages and in NNN cultures. While the pathological action of this parasite is similar to that of *L. braziliensis* and *L. tropica*, it resembles *L. donovani* in its response to chemotherapeutic agents. It has also been shown that guineapigs, which had spontaneously recovered from an infection or had been cured by specific drugs, acquired an immunity against reinfection, while partial resistance could be produced by vaccination with cultural forms killed by heat.

In the present paper are recorded further investigations on guineapig leishmaniasis, with special reference to factors influencing the host-parasite relations. The results of these experiments were as follows: (1) Out of 68 "clean" animals inoculated with leishmanial suspensions from ulcers of infected guineapigs, 98·5% became infected, with an incubation period varying from 4 to 44 days (average 14) and a grave form of the disease, showing no tendency to recover spontaneously. (2) Out of 35 "clean" animals inoculated with leptomonad forms from cultures, 85·7% became infected, with an incubation period from 13 to 97 days (average 18): the disease ran a benign course, with 30% spontaneous recoveries. (3) 14 animals were vaccinated with killed leptomonads from cultures of *L. enriettii*, and 17 with those of *L. braziliensis*: both groups were challenged with tissue forms of *L. enriettii* 30 days later: in the 1st group all the animals acquired a mild infection with recoveries in 57·1%, while in the 2nd group 14 became infected. (4) 14 young animals (10–30 days old) born from infected mothers, when inoculated with tissue forms of the parasites, responded like the guineapigs vaccinated with killed cultures. *C. A. Hoare*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

PSHENICHNOV, A. V. & NOSKOVA, E. G. **Production of a Strain of Human Lice feeding on Rabbits and its Significance for the Skin Membrane Method.** *Problems of Virology.* London. 1957, v. 2, No. 1, 49–52. [Translated from Russian.]

Human lice can be infected with various pathogens by feeding them artificially on blood or serum, through a prepared membrane. However, their subsequent feeding presents problems, for they cannot well be maintained on man where there is danger of disease. The authors describe the gradual transference of louse colonies from feeding on man to feeding on rabbits. This was done by alternate feeds on man and rabbit, with gradually increasing numbers of meals on the animal. [The Americans were experimenting with this idea as long ago as 1945: see SNYDER and WHEELER (this *Bulletin*, 1945, v. 42, 987); DAVIS and HANSENS (*Bull. Hyg.*, 1945, v. 20, 333). At the present time, large louse colonies are maintained in Orlando, Florida, entirely by feeding on rabbits, once daily: see SMITH and EDDY (this *Bulletin*, 1954, v. 51, 1117). This work is not mentioned in the Russian paper.] *J. R. Busvine*

MEL'NIKOV, L. A. **Serological Diagnosis of Rickettsial Diseases of the Exanthematic Typhus and Tick Spotted Fever Group by the Haemagglutination Method—I. Method of preparing the Antigen and performing the Test.** *Problems of Virology.* London, 1957, v. 2, No. 1, 16–20. [24 refs.] [Translated from Russian.]

Rickettsial antigens for the sensitization of sheep red cells were prepared by a method based on that described by CHANG *et al.* [this *Bulletin*, 1953, v. 50, 613], suspensions of infected yolk sacs being centrifuged, treated with ether, heated with alkali (NaOH) at 100°C. and dialysed against buffered saline. The resulting soluble antigen could be desiccated and stored at 4°C. for at least 5–6 months without loss of activity. The titre of the antigen was taken as the highest dilution which "completely sensitized the red cells" to human immune serum, the working dose being fixed at twice this strength. Antigens with high sensitivity in the haemagglutination reaction were prepared from *Rickettsia prowazeki*, *R. mooseri*, *Dermacentroxenus sibiricus* [the organism of Siberian tick typhus], *D. conori* and *D. marinus*. Yields were good, a single infected yolk sac providing sufficient *R. prowazeki* antigen for 10,000 tubes in the test proper. Attempts to obtain satisfactory antigens from *R. burneti* were unsuccessful.

In performing the haemagglutination reaction in tubes, dilutions of human sera (absorbed with sheep red cells to remove non-specific haemagglutinins) are mixed with sensitized cells and incubated at 30° C. or left at room temperature; a temperature of 37°C. or 4° C. is unsuitable. Results are read after 15–18 hours. A rapid slide test is also described. Investigations are being made to determine the value of the reaction in the diagnosis of rickettsial diseases. *R. S. F. Hennessey*

Foryś, S., Lutyński, R. & Raginis, Zofia. Poziom przeciwciał wiążących dopełniacz u ozdrowieńców po durze wysypkowym. [**The Antibody Level in Persons Convalescent after Typhus Fever measured by Complement-Fixation Test**] *Przegląd Epidemiol.* Warsaw. 1957, v. 11, No. 2, 157–62, 1 fig. [12 refs.]

The English summary appended to the paper is as follows:—

"Using the CFT, 50 sera obtained from persons, who have had typhus fever during the period of 1918–1955 were tested with *R. prowazeki* antigen. The initial dilution of each serum was 1:5.

"42 sera were positive, 8—negative.

"During a 4-year period after the onset of the illness all persons in test showed a positive CFT and after this period some sera were found negative.

"The antibody levels grow lower with the lapse of years after the onset of the illness.

"Unspecific positive CFT with titers 1:5, 1:10 were found in a number of persons who have never fallen ill with typhus fever."

Ali, M. A. & Subrahmanian, M. V. **Endemic (Flea) Typhus in Golconda.** *J. Indian Med. Ass.* 1957, Aug. 1, v. 29, No. 3, 110–11.

An account of 6 cases.

Ruiz Castañeda, M. Diferenciación entre *Proteus* OX-19 y OXK por fijación en superficie. [**Differentiation between *Proteus OX19* and *OXK* by the Surface Fixation Test**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1956, Dec., v. 16, No. 4, 1–5, 2 figs.

The English summary appended to the paper is as follows:—

"The 'Surface-fixation test' was applied to serological reactions using antigens prepared with Proteus OX-19 and OXK; these reactions prove to be specific when tested with sera from patients of typhus and of tsutsugamushi disease.

"Homologous combinations fix the antigen placed on filter-paper. heterologous combinations do not show fixation.

"The results obtained parallel those observed by means of tube agglutinations."

Audy, J. R. **A Checklist of Trombiculid Mites of the Oriental and Australasian Regions.** *Parasitology.* 1957, June, v. 47, Nos. 1/2, 217–94. [Numerous refs.]

"A checklist is given of the 320 species and four subspecies of trombiculid mites of the Oriental and Australasian regions described up to the end of 1955, together with a number from papers being published in 1956 and 1957 and consulted by the writer in manuscript or proofs.

"Eight new genera, six subgenera, and 175 species from the Oriental and Australasian regions have been described since the compilation of the checklist of world trombiculids by Wharton & Fuller [this *Bulletin*, 1953, v. 50, 983].

"The present list gives only the documentation and records necessary to bring the appropriate part of Wharton & Fuller's publication up to date. Cross-references are given to the monograph by Womersley [*ibid.*, 1952, v. 49, 942] and its appendix by Womersley & Audy (1957), as well as to the checklists of Gunther [*ibid.*, 1953, v. 50, (206)] and Radford [*ibid.*, 1955, v. 52, (225)].

"The taxonomic arrangement has been revised in accordance with recent publications. Four new combinations of species of *Neotrombicula* are recorded.

"A supplementary Faunal List is presented, confined to records which now require to be added to the Faunal List of Wharton & Fuller."

Nose, H. **Variations in Opsonin Index and Phagocytosis by Citrated Blood, determined with Proteus OXK, in Cases of Experimental Tsutsugamushi Disease.** *Acta Med. et Biologica.* Niigata. 1957, Mar., v. 4, No. 4, 289–310, 12 figs. [34 refs.]

"Opsonin index and phagocytic index by citrated blood were determined in cases of experimental tsutsugamushi disease, using Proteus OXK.

"1) Both opsonin index and phagocytic index by citrated blood varied with the lapse of days of illness but the changes did not run parallel to each other. While opsonin index changed in the incubation, febrile, and non-febrile periods and according to medication, phagocytic index by citrated blood generally began to increase about 1 week after the removal of fever. This fact suggests the existence of an immediate connection between phagocytic index by citrated blood and immunity.

"2) Both seemed to be closely related to fever. Opsonin index increased in the febrile period of the initial attack and relapse. It increased by administration of AM [aureomycin] if the patient was in high fever, but not if fever was light. Phagocytic index by citrated blood did not generally show any changes due to administration of AM, but in a case to which the drug was given after a long continuance of fever and fever tended to fall, the values showed a sudden rise. As a general rule, the values were higher in the cases in which fever continued long.

"3) Regarding phagocytosis by citrated blood, there was practically no difference in results whether the concentration of bacterial suspension was 1 mg./cc. or 10 mg./cc."

Wojciechowski, E., with Przybyła, Apolonia. Właściwości antygenowe szczepów *R. burneti* wyosobnionych w pierwszej epidemii gorączki Q w Polsce. [**Antigenic Properties of *R. burneti* Strains isolated from the First Q Fever Epidemic in Poland**] *Med. Dośw. i. Mikrob.* Warsaw. 1957, v. 9, No. 3, 281–7. [14 refs.]

The English summary appended to the paper is as follows: —

"Three strains of R. burneti isolated from the first Q fever epidemic in Poland (two strains from blood of patients and one from sheep wool) were compared with a standard strain (Henzerling). No marked differences in pathogenicity for guinea pigs and chicken embryos were demonstrated. By means of complement fixation and cross absorption tests, using sera of immunized guinea pigs, a considerable difference between the standard strain and strains isolated (507, 755 and 801) was found. The antigens of the latter were far less sensitive than that of the Henzerling strain, even in relation to homologous sera. Their sensitivity (and especially that of 755 strain) was markedly increased if fivefold concentrations were used. They were less sensitive in relation to human convalescent sera as well, though with infected sheep sera they gave positive results at the same titre as did the Henzerling strain suspension."

Enright, J. B., Sadler, W. W. & Thomas, R. C. **Pasteurization of Milk containing the Organism of Q Fever.** *Amer. J. Pub. Health.* 1957, June, v. 47, No. 6, 695–700, 2 graphs. [11 refs.]

This important study was officially undertaken on behalf of the California State Department of Public Health: the paper is only a summarized account of it. The authors first studied the frequency of occurrence and numbers of *Rickettsia burneti* in milk. It was found in 8 of 109 bulk raw milk samples, and in the milk of 18 of 137 individual cows in one herd. The numbers of rickettsiae varied up to 1,000 infective guineapig doses per 2 ml. (the volume used for inoculation). The milk of a cow artificially inoculated *via* the teat canal contained 10,000 infective doses per 2 ml. Proof of continued excretion of the organism for as long as 405 days was obtained.

It was decided to study the effect of heat treatment on milk containing 100,000 infective doses per 2 ml. Since evidence of infection in guinea-pigs is obtained by a complement-fixation test, and such an inoculum of killed organisms might cause antibody formation, passage to a second guineapig was carried out [no details given].

Commercial pasteurization plants were used for tests of heat treatment.

The results showed that 143°F. for 30 minutes cannot be depended on to destroy the organism but 145° can: in the high-temperature short-time process 160° for 15 seconds is not effective and 161° is. Thus if pasteurization is properly carried out *R. burneti* will be destroyed but the margin of safety is so narrow that the demonstrated occurrence of the organism in some samples of pasteurized milk is not surprising]. *L. P. Garrod*

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

DE RODANICHE, Enid & GALINDO, P. **Isolation of Yellow Fever Virus from** *Haemagogus mesodentatus*, *H. equinus* **and** *Sabethes chloropterus* **captured in Guatemala in 1956.** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 232–7 [13 refs.]

The wave of sylvan yellow fever which has affected Panama, Costa Rica, Nicaragua and Honduras since 1948 reached Guatemala in February 1956, when simian deaths were first noted. Collecting stations for diptera were set up in the Motagua Valley, where epizootic activity had been observed, and this paper records the isolation of yellow fever virus from specimens sent to the Gorgas Memorial Laboratory, Panama. Out of a total of 9,893 diptera, the virus was recovered from 14 pools of *Haemagogus mesodentatus* (4,021 specimens), 3 pools of *H. equinus* (1,668 specimens) and 4 pools of *Sabethes chloropterus* (3,141 specimens). These are the first recorded isolations of yellow fever virus from *H. mesodentatus*, *S. chloropterus* and pure pools of *H. equinus*. Some of the mosquitoes contained recently ingested blood which may have been the source of the virus. The results indicate that *H. mesodentatus* is epidemiologically the most important of the 3 species in the area concerned. *R. S. F. Hennessey*

TEESDALE, C. **The Genus** *Musa* **Linn. and its Rôle in the breeding of** *Aëdes* (*Stegomyia*) *simpsoni* **(Theo.) on the Kenya Coast.** *Bull. Entom. Res.* 1957, June, v. 48, Pt. 2, 251–60, 1 fig.

At 2 places on the Kenya coast routine observations were made from June 1950 to January 1952 on mosquito breeding in several different varieties of banana plants.

Larvae of *Aëdes simpsoni*, *A. metallicus*, *A. aegypti* and *Eretmapodites chrysogaster* were recorded but *A. simpsoni* was by far the most common

and occurred in all varieties of banana; it was in fact "virtually the only species present" and possibly occurs throughout the year.

Mosquito breeding took place to a lesser extent in some plant varieties than in others but it is not considered that control of *A. simpsoni* would be improved by restriction of propagation to these less suitable plants.

H. S. Leeson

Mellors, P. D. **Yellow Fever Vaccination by Scarification with the 17D Strain: an Appreciation of the Present Position.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, July, v. 51, No. 4, 338–45. [19 refs.]

With a view to developing a vaccine which would be not only safe and efficient but also comparable with the Dakar vaccine in its suitability for mass immunization and in its low cost of production and application, investigations into the possibility of employing 17D virus vaccine by scratch were begun in 1947 by Hahn [this *Bulletin*, 1952, v. 49, 43]. Since then trials of this method of immunization have been carried out in East Africa by Dick [*ibid.*, 1952, v. 49, 685], and in West Africa by Cannon and Dewhurst [*ibid.*, 1954, v. 51, 567; 1955, v. 52, 1185]. The results of these trials, 16 in number (including 5 not previously recorded) and representing a total of 42,490 persons vaccinated, are summarized in the present article. In 13 trials, comprising 32,249 persons, scarification was done with chick embryo vaccine and in 3 trials, comprising 10,241 persons, with a vaccine prepared from mouse brain infected with 17D virus, each batch of vaccine source mice having been inoculated with egg material. The chick embryo vaccine used by Hahn, for 3,836 persons, was crude whole chick suspensions; by Dick, for 153 persons, an ordinary injection vaccine (obtained in 1946 from the Rockefeller Foundation, New York)—the quantity of virus in terms of mouse intracerebral LD50 per person being 8,000 for 103 and 80,000 for 50; and by Cannon and his co-workers, for 28,260 persons, a vaccine made to WHO standards—the virus dosage per person varying from 1,500 to 22,000 LD50. The mouse brain vaccine, for 10,241 persons, was prepared according to the method described by Cannon and Dewhurst in 1955 and virus dosage per person varied from 1,000 to 13,000 LD50.

To evaluate the results of these trials serum specimens, collected from vaccinated persons just before or at the same time as vaccination and again from the same persons approximately 1 month later, were subjected to protection tests, successes being measured by the conversion from negative to positive protection in mice. Results showed mouse-brain and chick-embryo vaccines administered by scarification to be of equal value as immunizing agents, 85 ± 5% of persons being solidly protected by this method against yellow fever. Moreover 17D virus grown in mouse brain by the method of Cannon and Dewhurst would seem to be as safe as that grown in chick embryo; among 10,241 vaccinations carried out with 17D mouse brain material no ill effects were observed. Finally neither the

number of insertions (1 to 8) nor the virus dosage (1,000 to 80,000 LD50 per person) used in the trials appeared to have any influence on the final figures. At Yaba 1 cross-hatched scratch through each of 2 drops of vaccine applied over the deltoid is the current practice, while a titre of 2,000 LD50 per dose is regarded as the minimum, below which any batch is not issued—this allowing some reserve of titre against accidents which may occur during the mass use of the vaccine in the field.

G. Stuart

DENGUE AND ALLIED FEVERS

Smith, C. E. G. **A Localized Outbreak of Dengue Fever in Kuala Lumpur: Serological Aspects.** *J. Hygiene.* 1957, June, v. 55, No. 2, 207–23, 11 figs. [25 refs.]

This paper gives the results of neutralization, haemagglutinin-inhibition (HI) and complement-fixation (CF) tests on sera from persons involved in an outbreak of dengue due to type 1 virus [this *Bulletin*, 1957, v. 54, 25, 418]. Clear distinctions between antibodies to Japanese encephalitis (JE) virus and to dengue viruses could only be drawn by means of the neutralization test; in many cases distinction between the two types of dengue required examination of serial specimens over several months. The HI and CF tests were of no help in differentiation, and it was concluded that the main value of the HI test lay in detecting cases occurring in outbreaks where the causative virus had already been identified as type 1 or type 2 dengue virus, or as JE virus. Serological results on persons examined at Kuala Lumpur provided evidence of (a) immunity to dengue due to previous infection, (b) partial immunity to dengue due to previous infection, (c) inapparent infection with dengue, and (d) intercurrent inapparent infection with JE virus. It was noted that homologous neutralizing antibodies persisted for at least 30 weeks after infection, heterologous antibodies disappearing by that time. Homologous and heterologous antibodies detected by HI and CF tests usually persisted for 30 weeks.

R. S. F. Hennessey

Doherty, R. L. **Clinical and Epidemiological Observations on Dengue Fever in Queensland, 1954–1955.** *Med. J. Australia.* 1957, June 1, v. 1, No. 22, 753–6, 6 figs.

A large outbreak of dengue occurred in Queensland in 1954 [this *Bulletin*, 1956, v. 53, 1232] and this paper presents observations on 75 cases which were referred to the Innisfail Field Station of the Queensland Institute of Medical Research during the period March 1954 to May 1955.

The majority of patients suffered from a febrile illness with a few distinctive features, the duration of fever averaging 4·5 days. The symptoms and signs most frequently noted were headache (62 cases), lymph gland enlargement (47), generalized muscular pain (41), rash (31), vomiting (20), cough (19), faucial injection (17), conjunctival injection (15) and bradycardia (15). A biphasic temperature curve was seen 16 times. Between one-third and one-half of the patients showed a significant increase in complement-fixing antibodies for one or other antigen of the dengue group; Murray Valley encephalitis virus antigen was most frequently employed in the tests. Attempts to isolate virus from 29 patients were unsuccessful. Differences in geographical incidence are ascribed to variations in vector density associated with local differences in sanitary conditions. *R. S. F. Hennessey*

RABIES

Wang, S. P. **Statistical Studies of Human Rabies in Taiwan.** *J. Formosan Med. Ass.* 1956, Nov., v. 55, No. 11, 548–55.

Since 1948, when a human case was first recognized in Taiwan, rabies has constituted a major public health problem in that island territory. 709 human cases were reported in the 8-year period 1948–55 and of that number 263 occurred between 1952 and 1955, despite an intensification of control measures, in the years following 1951, over the main source of infection, the dog. As no wild animal has been incriminated in the transmission of the virus the aim of the authorities is, as it has been, to eradicate canine rabies by such measures as the immunization of domestic dogs and the elimination of strays.

Analysis of the data on human cases, resulting from the introduction of the virus into the northern part of the island in 1948 and from its gradual spread thereafter to the mid-west and south-west regions, shows that incidence has been continuous, month by month, with but little seasonal variation. 287 (40·48%) of the total 709 cases were found in the age-group of 15 years or under and 422 (59·52%) in older persons; highest incidence in any 1 age-group was 129 (18·2%) in that between 6 and 10 years. 494 (69·6%) of the cases occurred in males and 215 (30·4%) among females. Among the 263 cases reported during the 1952–55 period the incubation period was known in 235 instances: 79 (33·6%) of these—42 (46·5%) of 90 in the younger age-group of 15 years or under, as compared with 37 (25·5%) of 145 in the older age-group of 16 years and over—developed symptoms of rabies after an incubation period of 1 month or less; 104 (44·3%) after 1–3 months; 27 (11·5%) after 3–6 months; and 25 (10·6%) after 6 months or more.

For 242 of the 263 cases the biting animal was known: dogs accounted for 232 (95·9%) of the total; cats for 8 (3·3%); and swine for 2 (0·8%). For 179 of the 263 cases both history of vaccine treatment and incubation period had been noted; from these data it emerged that, among persons dying despite the administration of a complete course of anti-rabies vaccine, mortality was highest in those with short incubation periods of 1 month or less; thus incubations of such short duration were found in 17 (54·9%) of 31 persons receiving complete treatment. As regards the relation of the site of wounding to the incubation period of rabies, observations on 160 cases showed the percentage for short incubation periods of 1 month or less to be highest in head bites (66·6) and to be progressively lower in wounds of the upper extremities (31·0), of the lower extremities (26·6) and of the trunk (25·0). In the author's view the use of anti-rabies serum, in conjunction with a course of vaccine, offers the best means of saving those patients in whom a short incubation period does not allow sufficient time for the development of active immunity. *G. Stuart*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Bhaskaran, K. **Lysis of *Vibrio cholerae* by Thymol.** [Correspondence.] *Nature*. 1957, July 6, v. 180, 43.

When 50 mgm. of thymol was added to 10 ml. of a 4-hour broth culture of *Vibrio cholerae* at 37°C., rapid clearing due to massive lysis occurred in 30–45 minutes. Thymol is soluble in aqueous media only to the extent of about 1 in 1,500 and this may be the effective lytic concentration for *V. cholerae*. The rapidity of action simulates the "induction" seen in certain lysogenic bacteria after irradiation or treatment with chemical mutagens but lysogenic cultures of *V. cholerae* exposed to thymol did not show any appreciable increase in free phage particles. Also "indicator" strains used in the detection of lysogenic strains and themselves apparently non-lysogenic, were lysed equally effectively by thymol.

Other phenols did not produce perceptible lysis of the cultures in such a short time. Of those listed, only carbolic acid was lethal to *V. cholerae*.

It is suggested that thymol, because of its low toxicity and marked vibriolytic activity, might prove useful in clinical and laboratory studies on cholera. *H. J. O'D. Burke-Gaffney*

Bhaskaran, K. & Gorrill, R. H. **A Study of Antigenic Variation in *Vibrio cholerae*.** *J. General Microbiol.* 1957, June, v. 16, No. 3, 721–9. [12 refs.]

Changes in the antigenic type of *Vibrio cholerae* were investigated by exposing organisms to antiserum and subsequently plating to get discrete colonies which could readily be typed by covering them with a layer of sloppy-agar (0·5% agar) containing monospecific antiserum (Ogawa or Inaba), allowing the agar to set, and observing the appearance of the colonies after 15 minutes' incubation at 37° C. By this method, which enabled large numbers (thousands) of colonies to be differentiated, it was found that vibrios in the supernatants of 24-hour cultures of Ogawa strains in broth containing Ogawa antiserum were mainly of the Inaba type when the inoculum exceeded 10^7 organisms. When suspensions of Ogawa cultures in saline were exposed to homologous antiserum for 2 hours in the refrigerator, centrifuged, and the supernatants plated, the numbers of Inaba mutants present suggested a mutation rate of about 1 in 10^6. Growth of Inaba cultures in Inaba antiserum did not reveal any Ogawa-type mutants. The frequencies with which rough and non-motile mutants occurred in Ogawa and Inaba cultures appeared to be of about 1 in 10^4 divisions or less. It is considered that all the variations observed were due to spontaneous mutations in the parent cultures.

R. S. F. Hennessey

Chatterjee, H. N. **Treatment of Haemorrhagic Cholera and Severe Haemorrhagic Diarrhoea.** Reprinted from *Antiseptic*. 1956, June, v. 53, 433–6, 2 figs.

The author reports that haemorrhagic stools are found in 10% of patients with cholera and that he has attempted to assess the value of two Indian plants, *Coleus aromaticus* and *Euphorbia pilulifera*, in controlling haemorrhage in these cases [this *Bulletin*, 1957, v. 54, 568]. From a study of 15 cases of cholera it is concluded that *Coleus aromaticus* is not so efficacious when used alone in cases in which the stools are haemorrhagic as it is in those in which the stools do not contain blood. From a further group of 43 patients to whom extracts of *Euphorbia pilulifera* were given it was concluded that these extracts have no action on either the cholera vibrio or *Entamoeba histolytica* which was found in 3 patients from whose stools the vibrio could not be cultured, but that they are of value in limiting diarrhoea and haemorrhage in the stools, for these symptoms disappeared within 24 hours in 58% of the patients.

A. W. Woodruff

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

BURROWS, R. B. *Endamoeba hartmanni*. *Amer. J. Hyg.* 1957, Mar., v. 65, No. 2, 172–88, 1 fig. & 2 pls. [48 refs.]

Up to the present, the exact status of the small race of *Entamoeba histolytica* (*E. hartmanni*), its differential diagnosis from the large race, and the part played by it in the aetiology of amoebiasis, have remained unsolved, in spite of numerous works devoted to this problem.

In order to throw light on the characters distinguishing the small and large races, the author has made a thorough morphological study of the two races, on material obtained from 10 patients infected with the large amoeba, and 10 with the small one. In the course of this investigation a total of 350 trophozoites and 1,100 cysts were measured in slides stained with iron haematoxylin. In the case of the large race the trophozoites were represented by the commensal phase (= *minuta* form) of the amoeba.

The results, shown in tables and graphs, illustrated by figures, can be best appreciated in the following table compiled from the author's data.

Trophozoites:	*E. hartmanni*	*E. histolytica*
Size	5–7*–**11·4**	7–**11·3**–16
Size of nucleus	1·5–**2–3**	2·8–**3·4**–4·4
Karyosome	Large	Small
Cysts:		
Size	3·8–**6·6**–9·3	6·4–**10·2**–15·2
Nucleus in 1-n cyst	1·7–**2·3**–3	3·2–**4·2**–5·7
,, ,, 2-n ,,	**1·6**	**2·7**
,, ,, 4-n ,,	**1·2**	**1·9**
Glycogen vacuoles	Rare, not prominent	Common, prominent

* Figures in bold type indicate average size.

In addition to the small race, differing from the large one in various cytological features noted in the table, 1 patient harboured a mixed infection of large and small amoebae. While the latter were similar to *E. hartmanni* in size, their nuclear structure was like that in amoebae of the large race, on account of which these small amoebae are regarded as "dwarf" forms of *E. histolytica* (*sensu stricto*).

In discussing the nature of *E. hartmanni* the author reviews all previous data, according to which its nutrition is neither haematophagous nor histophagous; it reacts differently with *E. histolytica* antigen; it is more difficult to cultivate, and apparently causes no symptoms in its hosts. The author concludes that the small race differs from *E. histolytica* in about as many characters as the latter does from *E. coli*, while its nuclear structure is nearer to that of *E. coli*. In view of these differences

it can be regarded as a distinct species for which the name *E. hartmanni* Prowazek, 1912 should be reserved.

Since nearly one-half of human infections with 4-nucleate amoebae are due to *E. hartmanni*, the global incidence of *E. histolytica* has been grossly exaggerated in the past by observers who recorded the occurrence of both races indiscriminately.

[As the author—in common with some other American writers—refers the human entamoebae to the genus *Endamoeba*, it should be noted that the genus *Entamoeba* has been validated for these parasites by the International Commission on Zoological Nomenclature in 1951.]

C. A. Hoare

Nakamura, M. **Effect of Antimetabolites on Growth of *Endamoeba histolytica*. III. 5,6-Dimethylbenzimidazole and Related Compounds.** *Proc. Soc. Exper. Biol. & Med.* 1957, July, v. 95, No. 3, 524–6. [17 refs.]

"1,2-dimethyl-4,5-diaminobenzene was highly stimulatory to *Endamoeba histolytica* under bacteria-free conditions. 5,6-dimethylbenzimidazole, 2,5-dimethylbenzimidazole, 1,2-dichloro-4-sulfanilamido-5-aminobenzene and 1,2-dibromo-4,5-diaminobenzene were inhibitory to the amebas; the inhibition was overcome by either vit. B_{12} or the dimethyldiamine. 5-methylbenzimidazolone and 1,2-dichloro-4-nitro-5-hydroxybenzene were also inhibitory to the amebas, but reversal was not possible with B_{12}, dimethyldiamine, folic acid, or thymidine. It is suggested that the dimethyldiaminobenzene is a precursor of vit. B_{12} in *E. histolytica* and that the dimethylbenzimidazole and chloro- and bromo-substituted benzenes are antimetabolites of this precursor."

[See this *Bulletin*, 1957, v. 54, 40.]

Ferrara, A., Tigano, F. & Servadei, B. Manifestazioni neoplastiformi dell'amebiasi intestinale. [**"Neoplastic" forms of Intestinal Amoebiasis**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1957, Apr., v. 38, No. 4, 171–97, 14 figs. [23 refs.] English summary (6 lines).

This paper is really a "combined operation" as the specimens were removed by the third author who is Chief Surgeon to the Government Hospital at Misurata, Libya, and sent to the first and second authors at the special school for tropical diseases at the University of Messina.

The paper deals with the so-called neoplastic form of amoebiasis, or amoeboma, and gives complete details of clinical symptoms, pathology, treatment, and the result, in 12 patients, while in a further table the site of the amoeboma in 9 previously observed patients is given.

Out of the total 21 cases the caecum was the most common site, as it

was in 6 of the 12 detailed cases. The authors emphasize this predominant localization especially from the diagnostic point of view.

The growths vary in size from that of a nut to a human fist; they never completely surround the gut; the consistency is elastic with areas of softening, and the amoeboma tends rather to extend outwards than inwards so that obstruction of the intestinal lumen is not a marked feature. The neighbouring mesenteric lymph nodes are often hypertrophic. On section the growth is firm, with one or more central cavities and firm irregular edges; it contains material somewhat resembling the caseous matter in tuberculomas. Microscopically the lesion is a granuloma with few parasites. Charcot-Leyden crystals and obliterating vasculitis are found and a very high proportion of eosinophils, which are of almost diagnostic importance. The authors regard the amoeboma as a manifestation of a hyper-reactive mechanism, and not due to the histolytic action of the protozoon as such.

In diagnosis, the site, evolution, and response to treatment must be taken into account, though in the caecal cases a history of pain in the right iliac fossa with a swelling can be very confusing. Tuberculosis, lymphogranuloma, Crohn's regional ileitis, and above all carcinoma have to be considered. X-ray examination may not help, but sigmoidoscopy is useful. In the authors' cases *Entamoeba histolytica* were always found in the faeces.

Treatment is by the usual anti-parasitic drugs for an initial period, but surgery is often necessary as medical treatment is not always able to secure the disappearance of those amoebomas where there is considerable proliferation of the connective tissue. In operations on the caecum it is advisable to remove the appendix which always shows a chronic inflammatory condition and indeed may play some part in the formation of the caecal amoebomas. In all the 12 cases surgical intervention occurred and was followed by cure in 10. In 1 case, an adenocarcinoma of the rectal ampulla was present with chronic inflammation and ulceration close by. Here a one-stage abdomino-perineal excision was carried out.

W. K. Dunscombe

Corrêa, M. O. A. & Amato Neto, V. Tratamento da amebíase intestinal pelo bi-cloridrato de dialil-dietil-aminoetil fenol (Camoform). [**Treatment of Intestinal Amoebiasis with Camoform**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Jan., v. 8, No. 1, 113–16.

The English summary appended to the paper is as follows:—

"Fourteen patients with intestinal amebiasis, none of which was in the acute stage, were treated with diallyl-diethyl-aminoethyl phenol dihydrochloride (Camoform). In only one case, *Endamoeba histolytica* was still found after treatment was finished. Dosage varied with the patient's age. Tolerance to the drug was satisfactory."

Driss, M. Z. De l'utilisation de la Néomycine dans le traitement de l'amibiase intestinale au Maroc. [**Use of Neomycin in the Treatment of Intestinal Amoebiasis in Morocco**] *Maroc. Méd.* 1957, May, v. 36, No. 384, 490–93.

At Rabat in Morocco the author has treated 60 patients suffering in varying degree from intestinal amoebiasis with neomycin, given orally. The dosage was 2·5 gm. daily for 3 days, then 2 gm. daily for 3 days, and finally 1 gm. on the 7th day. "Consolidation treatment", with a variety of drugs, was then given after 2 or 3 stools had been examined. The neomycin treatment was not associated with side effects. Of the 60 patients treated with it 50 were freed of their parasites, as judged by the stool examinations following the treatment; 5 continued to pass flagellates or monilia, and so were regarded as partial cures; and as the remaining 5 still excreted cysts of *Entamoeba histolytica* the drug was taken to be ineffective in them. *A. R. D. Adams*

Westphal, A. Experimentelle Infektionen des Meerschweinchens mit *Balantidium coli*. [**Experimental Infection of Guineapig with *Balantidium coli***] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos.1/2, 288–94, 2 figs. [Numerous refs.]

After reviewing previous reports of experimental infection of laboratory animals with *Balantidium coli*, the author describes his own investigation, carried out with guineapigs. These animals were maintained on vitamin-deficient diets consisting of (1) grain, bread and water, or (2) flour, crushed grain and supplements (without ascorbic acid); in addition, all the animals received greenstuffs twice a week. On these diets they survived on the average 38 and 41 days respectively.

B. coli from pigs were inoculated into the guineapigs intracaecally in doses of 0·5 cc., containing 50–210 ciliates. Of 9 guineapigs kept on Diet 1 and killed a week after inoculation, 6 became infected with ciliates in the caecum and colon. The 10 animals on Diet 2, which were killed between 5 days and 4 months after inoculation, all became infected and showed ciliates in the caecum and colon, while in 5 the lower portion of the ileum was also involved. In none of the experimental animals was any macroscopic ulcer visible, but in sections of the caecal wall *B. coli* could be detected within the tissues.

The invasion of tissues in human and guineapig balantidiosis is depicted in photomicrographs. *C. A. Hoare*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Addamiano, Laura & Babudieri, B. Studi di immunità crociata tra alcuni ceppi di spirochete della febbre ricorrente. [**Studies on Cross-Immunity between Certain Strains of Relapsing Fever Spirochaetes**] *Rendiconti Istituto Superiore di Sanità*. Rome. 1957, v. 20, Pt. 4, 440–48. [11 refs.]

The English summary appended to the paper is as follows:—

"The Authors, after a short bibliography, report on certain tests of cross-immunity which they conducted with certain strains of relapsing fever spirochaetae.

"Five strains were used: 4 from Jordan (Irbid, Husn, Saham and Nablus) and one from Central Africa (Itete). Five lots of mice were infected with these strains: one strain for each lot 20 to 40 days after the infection, the animals were sterilised with a massive dose of chloromycetin succynate. At a later stage, each lot of mice was divided into five groups: in each lot one group was inoculated with the homologous strain, and the other five groups with the four heterologous strains.

"The results obtained prove that the strains studied by the Authors cause in the mice an immunity to the homologous strain, to such a degree as to prevent the recurrence of infection. Immunity does not generally exist with respect to heterologous strains, which can subsequently infect the test animals.

"Between the two Jordan strains, Husn and Irbid, there exists a 'one-way immunity', i.e. the mice immunised against the Husn strain fall ill again after inoculation with the Irbid strain, while the mice immune against the Irbid strain are also immune against the Husn strain."

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Contreras, F. **Secondary Infections and Neoplasms in Leprosy Patients.** *Leprosy Review*. 1957, July, v. 28, No. 3, 95–107, 8 figs. [Numerous refs.]

When patients who have been diagnosed as suffering from leprosy are sent to the specialist he must keep in mind 3 possibilities. (1) Leprophilia, which is the term given to those who for some reason, such as to avoid separation from a member of the family who has leprosy, pretend they have the disease. The author found 5 of these among about 300

patients. (2) Mistaken diagnosis, which accounted for 11 out of 803 patients seen; of these there were 6 with different form of pigmented dermatosis such as chloasma, vitiligo, scleroderma; but the most frequent cause of error was cancer of the face, and vivid illustrations are given of some of these. (3) Lastly there are various conditions which accompany leprosy and which may mistakenly be supposed to be caused by leprosy. Among these are the various parasitic dermatoses, filariasis, fungoid infections, pyogenic dermatoses and tuberculosis. Syphilis causes lesions resembling leprosy, and the latter disease often gives false serological reactions and is thus mistaken for syphilis. Other diseases requiring differential diagnosis from leprosy are lupus erythematosus, erysipelas, leishmaniasis, Chagas's disease and cancer.

The question whether or not leprosy affects the occurrence of cancer is then discussed with the authorities differing in their opinions. 4 cases of combined leprosy and cancer are mentioned as occurring in Spain and are known to the author. The meticulous study of all patients suspected of suffering from leprosy, and also of their relations, is emphasized. "Infections and parasitic affections are probably more frequent among our patients than in the general population." *E. Muir*

Wheate, H. W. **Thiosemicarbazone in the Treatment of the Reactional and Borderline Forms of Leprosy.** *Leprosy Review.* 1957, July, v. 28, No. 3, 124–9.

After recounting the experience of other workers with thiosemicarbazone in leprosy [this *Bulletin*, 1955, v. 52, 54] the author mentions that there are certain patients with leprosy, more frequent in East than in West Africa, who are incapable of standing treatment with DDS. It is important to differentiate these before treatment is begun and they may be recognized as of 2 types:—(1) Major tuberculoid with a flat hypopigmented zone extending beyond the most raised portion of the patch, and frequently involving the palms of the hands and soles of the feet and mucosa of lip, nostril or conjunctiva. (2) Reactional and borderline cases in which there are grossly raised plaque-like lesions, painful when pinched between finger and thumb. Both these groups have positive skin smears. There are patients in whom recognition of intolerance to sulphone treatment has to be made after treatment has been begun, including the major tuberculoid cases with minimal atypical signs, cases of the indeterminate type and a minority of lepromatous cases.

Such patients, either from the beginning of treatment or after severe reaction has occurred, should be put on thiosemicarbazone: 50 mgm. daily on 6 days a week for 2 weeks, then 100 mgm. for 2 weeks, and then 150 mgm. daily. When reaction has subsided, generally after 6 to 12 months, the patient may be transferred to DDS treatment. 6 case histories are given. *E. Muir*

Swerts, L. Réexamen des lépreux en traitement ambulatoire. [**Re-Examination of Leprosy Patients having Ambulatory Treatment**] *Ann. Soc. Belge de Méd. Trop.* 1957, Apr. 30. v. 37, No. 2, 291–4.

The English summary appended to the paper is as follows:—

"There was a re-examination of 2,883 lepers, with about 50% treated for less than four years, and 50% for more than four years. The first group continued treatment. The second group shows the following results: 37·6% placed under observation without treatment; and 62·4% continued treatment, as follows:

40% for ulcers;
32% for progressive neuritis;
21% for active macules, and
7% as a precaution (former lepromatous).

"Some clinical details are given."

Nakamura, M. **Attempts to approach to the Clarification of Chemical Composition of *Mycobacterium lepraemurium*. III. Chemical Composition of the Bacilli separated from the Subcutaneous Tissue of Rat infected with *Mycobacterium lepraemurium* by Pretreatment with Trypsin.** *Kurume Med. J.* 1956. v. 3, No. 3. 133–45. 6 figs. [15 refs.]

The organisms were separated from the tissue of subcutaneous lepromas of rats by first homogenizing the leproma and suspending it in distilled water, removing the coarser particles of tissue debris by centrifuging at 2,000 r.p.m. for 5 minutes and then digesting the remaining tissue with trypsin. After digestion an equal volume of 0·4 *M* sucrose was added to the mixture and the organisms separated by centrifuging through a layer of 0·3 M sucrose solution at 4,500 r.p.m. for 10 minutes. The packed bacilli were resuspended in 0·2 M sucrose and centrifuged through a layer of 1·5 M KCl solution. The packed bacilli were then chemically analysed.

The analysis showed that *Myco. leprae-murium* contained approximately one-half the nitrogen and carbohydrate content of *Myco. phlei*, and one half the nitrogen and about one-third the carbohydrate content of *Myco. tuberculosis*. The alcohol-ether-extractable content of *Myco. lepraemurium* was about one and a half times that of *Myco. phlei* and twice that of *Myco. tuberculosis*. The total phosphorus content was about the same as that of *Myco. tuberculosis* and about one-half of that of *Myco. phlei*, but when further differentiated the concentration of the acid-soluble fraction was approximately the same in the 3 organisms, that of the phospholipid was about twice as high in *Myco. leprae-murium* as in the other organisms, that of the nucleic acid phosphorus was about one and a half times as great in the other organisms as in *Myco. leprae-murium*, and that of the phosphoprotein was about one and a half times higher in *Myco. phlei* than in the other 2 organisms.

These results differ from those previously reported by the author for organisms isolated by the chloroform extraction method as used for the preparation of the lepromin antigen [this *Bulletin*, 1956, v. 53, 1353], and they suggest that the present method might produce a more specific antigen for this test. *S. R. M. Bushby*

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—TREMATODES *(schistosomes, other flukes);* CESTODES *(Diphyllobothrium, Taenia, Echinococcus, other cestodes);* NEMATODES *(Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.).*

FAN, P. C., HSU, J. & LIU, J. C. **Survey and Treatment of Intestinal Helminths in Rural Primary School Children in Northern Taiwan, Free China.** Reprinted from *Chinese Med. J.* Taipei. 1956, June, v. 3, No. 2, 60–69. English summary.

DESCHIENS, R. Les facteurs conditionnant l'habitat des mollusques vecteurs des bilharzioses, leurs incidences épidémiologiques. I. Généralités. Facteurs physiques. [**Epidemiological Aspects of the Factors Conditioning the Habitat of Snail Vectors of Schistosomiasis. I. General Observations. Physical Factors**] *Ann. Inst. Pasteur.* 1957, May, v. 92, No. 5, 576–85. [14 refs.]

——————— II. Facteurs chimiques. Nutrition. [**II. Chemical Factors. Nutrition**] *ibid.* 1957, June, v. 92, No. 6, 711–27, 1 fig. [19 refs.]

A general review and discussion, which should be read in full by those interested.

DE MORAIS, T. Subsídios para o estudo dos moluscos vectores da bilharziose na Zambézia (Moçambique). [**Study of Snail Vectors of Schistosomiasis in Zambesia, Mozambique**] *Anais Inst. Med. Trop.* Lisbon. 1956, Dec., v. 13, No. 4, 883–99, 8 figs. [4 on 3 pls. (1 folding)].

The English summary appended to the paper is as follows:—

"From the survey of 142 water supplies in the Zambézia District the author found 3 species of snails possible vectors to Bilharzia and 5 other different species.

"Of the vector species *Bulinus* (*Physopsis*) *globosus* was the more frequent.

"Vector species were found in all the administrative divisions of the District with the exception of Pebane and Namarroi where no snails of any kind were found.

"50·14% of the examinations were positive to the presence of snails and 34·5% presented *Bulinus* snails. *Biomphalaria* snails were only found in Alto Molocués, Morrumbala and Chinde.

"Examining the vector snails the author found them infected with three types of *cercariae*: Single tailed *cercaries*, short tailed *furcocercariae* and long tailed *furcocercariae*."

DE BONDT, A. F. Contrôle biologique des mollusques d'eau douce et des maladies qu'ils transmettent. [**Biological Control of Freshwater Molluscs and of the Diseases transmitted by them**] *Ann. Soc. Belge de Méd. Trop.* 1956, Oct. 31, v. 36, No. 5 *bis*, 667–72.

Because of the disadvantages associated with the molluscicides at present available the author considers that biological control of fresh-water molluscs by fish offers a more suitable and practical method. Partial control by ducks and toads is possible under certain circumstances but is not highly practicable. Many fish of Central Africa such as *Chrisychtys mabusi*, *Astatorcochromis alluaudi*, *Synodontis* sp. and *Haplochromis mellandi* are malacophagous, but only the last-named has been used in these experiments. This fish was found to feed on insect larvae and molluscs, both Lamellibranchs and Gastropods. Its culture is not very difficult and resembles that of *Tilapia*.

In the first experiment it was found that in fish ponds the introduction of this fish resulted in the rapid disappearance of molluscs. In rice fields where 100 fry of about 2·3 gm. weight were introduced per 100 sq. metres the mollusc population was completely eliminated. In canals of low gradient in the Fisheries Research Station at Kipopo in the Belgian Congo the introduction of *H. mellandi* at 1 fish per metre resulted in the clearance of a heavy infestation of molluscs in 8 days whereas clearance was obtained in rather more than 15 days at 1 fish per 10 metres.

An instance of the effectiveness of the technique is given where in a fish pond at Wangermee the yield of *Tilapia* was drastically reduced by infection of the fish by a trematode of *Diplostomum* species. The adult of this parasite is found in fish-eating birds and the larval stages in molluscs and fish. After the introduction of *H. mellandi* to the fish pond, in one year the molluscs had practically disappeared, young fish [*Tilapia* ?] were found to be in a healthy state and the yield of the pond returned to what it was before the infection occurred. All the *Diplostomum* were eliminated from the fish ponds of Wangermee and all other parasites transmitted by molluscs were reduced in the same way. The

use of *H. mellandi* in natural waters offers many problems associated chiefly with the physiographical characters of these waters, but it is thought that where the environment is suitable for their development an effective measure of control could be obtained even if complete elimination of the molluscs was not achieved. It is considered that the judicious use of *H. mellandi* would give effective control of molluscs and permit the extension of pisciculture and rice culture without the risk of increasing diseases transmitted by fresh-water molluscs. *O. D. Standen*

Hairbrich, W. S. & Wells, R. M. **Observations on Infestation by *Schistosoma mansoni* in Puerto Rican Troops.** *U.S. Armed Forces Med. J.* 1957, Aug., v. 8, No. 8, 1093–1101, 6 figs.

"Among 43 young, native, Puerto Rican soldiers, slightly more than one third were found to harbor *Schistosoma mansoni* as manifested by ova in the stools or by granulomas in the rectal mucosa and liver. Almost without exception the infestations were latent and asymptomatic. Active treatment of such disease as encountered in this group is not recommended."

[These Puerto Rican soldiers were stationed in the continental United States.]

Harry, H. W., Cumbie, B. G. & Martinez de Jesus, J. **Studies on the Quality of Fresh Waters of Puerto Rico relative to the Occurrence of *Australorbis glabratus* (Say).** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 313–22. [16 refs.]

"In Puerto Rico, *Australorbis glabratus* occurs throughout the range of pH and temperature found. It occurs in the maximum concentrations of CO_3, HCO_3, Cl, SO_4, Ca and Mg found in fresh waters here. It is generally but not invariably absent from situations normally having less than 150 ppm. dissolved solids. Yet experimentally, the snail can be maintained for at least two weeks in redistilled water. Small amounts (about 0·1 ppm.) of copper in distilled water produce distinct, incapacitating distress in the snails within a few hours time. Copper concentrations in natural waters range from 0·000 to 0·330 ppm. Most concentrations of copper greater than 0·020 occur in waters of less than 150 ppm. It is suggested that copper, and perhaps other heavy metals, may be the factors responsible for the absence of this snail in most dilute waters. A large excess of weak acid radicals (CO_3 and HCO_3) over strong acid radicals (Cl and SO_4) is suggested as related to the absence of this snail in flowing waters on limestone."

[See also this *Bulletin*, 1957, v. 54, 308 *bis*.]

Paraense, W. L. **A Genetic Approach to the Systematics of Planorbid Molluscs.** Reprinted from *Evolution*. 1956, Dec., v. 10, No. 4, 403–7.

In order to determine the presence or absence of genetic separation in species of *Australorbis*, separable morphologically by only small anatomical differences, mating experiments were carried out by crossing normal pigmented specimens with the occasional naturally occurring recessive albinos. It was found that, when isolated, the spermatozoa of this genus were fully utilized under conditions of self fertilization. However, when copulation was permitted, the foreign sperm was utilized in preference to the selfing sperm. This was observed after the crossing of albino specimens with fully pigmented individuals and observing the character of the offspring produced from the albinos. Having established that cross fertilization was the normal method of reproduction, the author experimented by mating *A. glabratus* with *A. nigricans* and both these species with *A. centimetralis* where in each pair one or other of the species was an albino. In all tests the albino and pigmented specimens maintained themselves in strict reproductive isolation. When comparison was made with the interspecific morphological differences it was found that, of all the planorbids tested, matings between those with and without the renal ridge never produced hybrids, while all possessing a renal ridge were interfertile, as were all those where the ridge was absent. Thus the technique provided a genetic means of testing the validity of particular morphological characters for separation of species.

When mating was carried out between conspecific individuals of *A. glabratus* from regions separated by great distances it was found that the offspring from albinos mated with pigmented specimens were never all pigmented, thus indicating less than full utilization of the foreign sperm and partial use of the selfing sperm. The results indicate a lowered fertility between allopatric conspecific populations. In *A. glabratus* from Santa Luzia (Minas Gerais) and João Pessoa (Paraiba), localities of some 1,800 kilometres apart, almost complete reproductive isolation was observed. Crosses between races more closely situated are being attempted. It is considered that these experiments emphasize the role of geographical speciation in the development of this animal group. [For previous studies, see this *Bulletin*, 1956, v. 53, 1132; 1957, v. 54, 60 *bis*.]

O. D. Standen

Fraga de Azevedo, J. & Gonçalves, Maria M. Ensaios sobre o estudo da numeração cromosómica de algumas espécies de moluscos de água doce. [**Studies on the Enumeration of Chromosomes in Some Species of Freshwater Molluscs**] *Anais Inst. Med. Trop.* Lisbon. 1956, Dec., v. 13, No. 4, 569–77, 3 figs. on 3 pls. [16 refs.] English summary.

Fraga de Azevedo, J. & Carvao Gomes, F. A., with the collaboration of A. M. Batista, F. Bragança Gil & E. M. de Magalhaes. L'application des radio-isotopes à l'étude du métabolisme des mollusques d'eau douce (*Gasteropoda pulmonata*). [**Application of Radio-Isotopes to the Study of the Metabolism of Freshwater Molluscs**] *Ann. Soc. Belge de Méd. Trop.* 1956, Oct. 31, v. 36, No. 5 *bis*, 609–16, 13 figs. on pl.

The authors have continued their series of experiments [this *Bulletin*, 1957, v. 54, 976], with radio-active isotopes, on the absorption of various elements by fresh-water molluscs and the ultimate distribution of these substances in the tissues. In the present series, the absorption of ^{32}P, and ^{131}I was observed in *Helisoma duryi normale* and ^{64}Cu in *H. duryi normale*, *Planorbarius corneus*, *Biomphalaria pfeifferi* and *Australorbis glabratus*. The distribution of radio-active material in tissue sections was recorded by the autoradiographic technique. The labelled salts added to the water were sodium orthophosphate, potassium iodide and copper sulphate. It was found that all 3 elements were absorbed from the environment. Phosphorus was concentrated in the hepatopancreas after absorption by the intestine and diffusion through various organs; iodine was found to be absorbed chiefly by the hepatopancreas but absorption was less marked than that of phosphorus; copper was absorbed by various organs and was found to act as a protoplasmic poison. The addition of sodium orthophosphate, sodium sulphate, calcium carbonate and sodium iodide to the water containing ^{64}Cu did not interfere with the absorption of copper. *O. D. Standen*

Barbosa, F. S. & Coelho, M. V. Pesquisa de imunidade adquirida homóloga em *Australorbis glabratus* nas infestações por *Schistosoma mansoni*. [**Investigation of Homologous Acquired Immunity in *Australorbis glabratus* infected with *Schistosoma mansoni***] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Jan., v. 8, No. 1, 49–56, 4 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"Searching for a possible immunity acquired by the snail *Australorbis glabratus* to the infection by *Schistosoma mansoni* several experiments were performed using one trematode homologous strain. These experiments were performed re-infecting cured snails or using miracidia of one sex to re-infect snails already harbouring the opposite sex infection.

"Results can be summarized as follows:—

"1. Snail harbouring one sex infection were successfully re-infected by the opposite sex miracidium.

"2. Cured snails were easily re-infected.

"3. The blood from infected snails shows no detectable effect against the same strain of miracidium.

"4. In the re-infected group of snails, tissue reactions were different from those obtained in the uninfected group. The re-infected snails show a more distinctive cellular reaction around some of the penetrating miracidia. These reactions were not, by any means, generalized but they indicate some difference in the behaviour of the studied groups of snails."

CHAIA, G. Técnica para concentração de miracídios. [**Technique for the Concentration of Miracidia**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Apr., v. 8, No. 2, 355–7, 1 fig.

The English summary appended to the paper is as follows:—

"To obtain concentration of miracidia there was proposed the following method:

"1) Separate the eggs from impurities by two sedimentation of 15 minutes in solution of NaCl 0·9%; discard the liquid.

"2) After the second decantation fill up the beaker with dechlorinated water of 25–28°C and mix.

"3) Transfer the content of the beaker to a 250 ml separatory funnel and complete with dechlorinated water.

"4) Close the funnel with a rubber stopper.

"5) Invert the funnel then open the stopcock and add a few ml of water to bring the liquid level well above the stopcock.

"6) Expose the whole body of water for 30 minutes to the light, then place the funnel in the inverted position into a wooden box in such a way, that the dropping tube and stopcock will pass through the top remaining exposed to a luminous source, whereas the funnel will be enclosed in the dark.

"7) After the miracidia have been concentrated in the top few ml of water, close the stopcock, invert the funnel to its natural position and collect the concentrate on a watchglass.

"8) One can repeat the concentration with the same batch for a second time, starting from point 5."

PELLEGRINO, J., POMPEU MEMÓRIA, J. M. & MACEDO, D. G. **Quantitative Aspects of the Intradermal Test with Cercarial Antigen in Schistosomiasis.** *J. Parasitology.* 1957, June, v. 43, No. 3, 304–7, 1 fig.

The authors, in Brazil, prepared an antigen from cercariae of *Schistosoma mansoni* obtained from infected *Australorbis glabratus*. The cercariae were concentrated in Büchner funnels fitted with porous plates, and dried over calcium chloride; the deposit was ground up and 10 mgm. were suspended in 10 ml. of Coca's solution with merthiolate (1:5000). After 8 days at 6° to 8°C., with daily shaking for half an hour, the supernatant was removed by spinning at 1,500 r.p.m. for 30 minutes.

This was the antigen (used in 1:1000 and other concentrations). The authors conclude with the following summary and conclusions:—

"The intradermal test with cercarial antigen was performed in 250 patients with stools positive for *S. mansoni* eggs. The patients were taken from 3 age groups: 10 to 15 years (100 individuals); 16 to 19 years (50 individuals) and 20 years and more (100 individuals). The injections were applied to the flexor surface of the forearms on the same occasion for each patient and five different concentrations of the antigen (10^{-7} to 10^{-3}) and a control were used. In all instances a volume of 0·05 ml was injected. Fifteen minutes after the injections the limits of the wheals were outlined with ink and the areas determined with a planimeter. The analysis of the results gave evidence of the following:

"1—The average responses, i.e. the mean areas of the wheals, increase with the concentration of the antigen in all age groups. There was no response from the 10^{-7} concentration.

"2—The relation of the mean response to log concentration of the antigen was linear within the range of the concentrations 10^{-6} to 10^{-3}.

"3—The greatest response was observed in the oldest age group and the smallest in the youngest one, for all concentrations."

A. R. D. Adams

Schneider, M. D. & Radke, K. G. **Further Observations on a Complement-Fixing Substance from** *Schistosoma mansoni*. *Proc. Helminthological Soc. of Washington*. 1957, July, v. 24, No. 2, 137–9.

In a previous communication [Schneider *et al.*, this *Bulletin*, 1956, v. 53, 1440] the isolation of a complement-fixing substance from *S. mansoni* was described. In the present paper further details are given about its preparation. [For these, the original must be consulted.] The final material obtained was non-dialysable and insoluble in 80% ethanol. It reacted with human serum in the complement-fixation test when the antigen was diluted 1 in 8, and the serum at least 1 in 16. It showed only low anticomplementary activity. *F. Hawking*

Huang, Ming-Hsin, Chiang, Shao-Chi, Lu, Cheng-Wei, Yu, Kuo-Juei, P'An, Juei-P'eng, P'An, Ju-Sun & Kuo, Pang-Fu. **Schistosomiasis Dwarfism.** *Chinese Med. J.* Peking. 1957, June, v. 75, No. 6, 448–61, 15 figs. [13 on 3 pls.].

Dwarfism is common in schistosomiasis-endemic areas of China. Anthropometric studies in 3 villages where the infection rate is over 90% showed 25 (4%) of the total population of 623 to be dwarfs; 17 of these were males and 8 females. All of them had proven schistosomiasis with frank liver cirrhosis; they constituted 4·5% of those infected with

the parasite; 21 of them were aged 16–20, and their survival beyond 30 years of age is unusual. The physical development of the dwarfs was about that of children of 12 or 13 years of age. They were physically weak and lacking in stamina though quite well proportioned; mentally they were normal and indeed unusually sensitive. Infections with other worms, or with malaria, it has been suggested, may result in dwarfism, but in these studies only a direct causal association with schistosomiasis [Far Eastern] was found. In all of these cases there was a history of frequent and prolonged exposure to schistosomal infection in early childhood.

Detailed physical examinations, X-ray, and biopsy studies showed in particular infantile sexual development and retardation of the growth and maturation of bone, with delayed union of the epiphyses; the female pelves were funnel-shaped. Full details of these and of many biochemical studies are set out in a series of tables. There is no support for a suggestion that the mechanism of this particular stunting of growth is a form of cretinism due to thyroid deficiency; heredity, nutritional deficiency, and other parasitic diseases equally are not responsible for it. It is a " schistosomiasis dwarfism "; and the authors consider that it is suggestive of pituitary origin, with deficient secretion of the growth hormone of that gland. The lack of gonadotrophic hormones was evident in the infantilism revealed by testicular biopsies. Autopsy of a female schistosomiasis dwarf showed atrophic and fibrotic changes in the pituitary, adrenal cortices, and the thyroid, and infantile ovaries. The changes in the thyroid were less marked. Depression of the pituitary function in these cases appeared to be mainly the result of dynamic disturbances of the central nervous system, rather than solely of intoxication of the gland by products of the parasites; a number of related factors doubtless also were operative.

Specific treatment of the schistosomiasis with antimony produced marked amelioration of their condition with an increase in stature, development of the sex organs and secondary sexual characters, and improvement in vigour and physical strength within a year. Early effective treatment is essential to forestall irreparable physical changes.

A. R. D. Adams

Chu, Ch'ing Fan. **Schistosomiasis japonica of the Colon complicated with Carcinoma.** *Chinese Med. J.* Peking. 1957, June, v. 75, No. 6, 500–508, 5 figs. on 2 pls. [12 refs.]

Reports on malignant disease resultant on infection with *Schistosoma japonicum* are few in number and of relatively recent origin; the author lists them [see, for example, this *Bulletin*, 1933, v. 30, 210; 1950, v. 47, 143]. Between 1950 and 1955 among 20,931 surgically obtained specimens 88 examples of carcinoma of the colon have been found; 10 (11·36%) of these were associated with *S. japonicum* infection. Details

of the local pathology and the histology of these 10 specimens are set out in a table; there are full reports on the clinical and autopsy findings of patients supplying 3 of them. In the author's view the adenocarcinomatous changes occurring in the colons of these 10 patients were primarily due to the irritation caused by the schistosome ova; they were not merely coincidental with the worm infection. *A. R. D. Adams*

Williams, J. E., Otori, Y., Moon, A. P., Frick, L. P. & Ritchie, L. S. **Repopulation Control of *Oncomelania nosophora* by Molluscicidal Applications against Juvenile Snails through the Medium of Irrigation Water.** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 304–12.

Field trials with dinitro-o-cyclohexylphenol and sodium pentachlorophenate for the control of repopulation of areas by *Oncomelania nosophora* following molluscicidal control of the adult snails were carried out in the Takagawara and Funayamabashi areas of Yamanashi Prefecture, Japan. The trials were conducted over 2 seasons in 1954 and 1955. Dinitro-o-cyclohexylphenol was applied for 6 hours at a final concentration of 1 p.p.m. in 1954 and 2 p.p.m. in 1955. At Funayamabashi the 2 applications in 1955 were of sodium pentachlorophenate. Applications were made at daybreak. After completion, the irrigation flow was interrupted until the following morning so that exposure was prolonged to 24 hours. Sampling was made at several sites with simultaneous collection for 1 hour by a team of 4 to 6 collectors. Catches were estimated in terms of snails per man-hour. The tests were designed to kill snails too small to be collected in the ordinary way, so collections were made at intervals after exposure. The susceptibility of very young snails was then estimated from the sizes of snails collected at these times coupled with knowledge of the normal growth rate of the species.

At Takagawara, where the snail population had not been treated previously, suppression of repopulation was achieved in only 3 of 6 sites when the chemical was applied at 1 p.p.m. When in the following year the concentration was increased to 2 p.p.m., 95% reduction of population was obtained in the feeder ditches and 75% in drainage ditches where the water-borne chemical had traversed rice fields. At field edges the clearance rate was negligible.

In 1954 at Funayamabashi, where an early spring application of molluscicide had markedly reduced the adult population by the time of the first summer treatment, these further applications of 1 p.p.m. gave a marked reduction in repopulation. After an increase to 2 p.p.m. in 1955 the original figure of 42 snails per man-hour in August 1954 was reduced to only 1 young snail in 245 minutes collecting time by August 1955.

It is concluded that if molluscicides can be used to reduce the prevailing adult snail population to the point of individual isolation then repopulation

control against juvenile *O. nosophora* is feasible in the irrigation systems of Japan. *O. D. Standen*

Batten, P. J., Jr. **Histopathology of Swimmers' Itch. II. Some Observations on the Pulmonary Lesions in the Unsensitized Mouse.** *Amer. J. Path.* 1957, July–Aug., v. 33, No. 4, 729–35, 2 figs. on pl. [12 refs.]

"The gross and microscopic changes in the lungs of mice exposed to cercariae of *Schistosomatium douthitti* and *Gigantobilharzia huronensis* are very similar. There was congestion of the interalveolar capillaries, as well as alveolar and bronchiolar hemorrhage. Tissue histiocytes containing hemosiderin were a prominent feature in those areas where extensive hemorrhage occurred. Many cercariae were observed in the alveoli and in the capillaries, but there was no demonstrable cellular reaction to these parasites. There were no dead cercariae observed in the lungs. There was a diffuse interstitial pneumonitis present during the second and third weeks following exposure."

Mazzotti, L. *Lymnaea humilis* (Say), huesped intermediario de *Fasciola hepatica*. [*Lymnaea humilis* **as an Intermediate Host of** *Fasciola hepatica*] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1956, Dec., v. 16, No. 4, 21–3, 1 fig.

The English summary appended to the paper is as follows: —

"Experimental infection of *Lymnaea humilis* (Say) with *Fasciola hepatica* is reported."

Bearup, A. J. **Experimental Vectors of the First Larval Stage of** *Dibothriocephalus latus* **(Cestoda) in Australia.** *Australian J. Exper. Biol. & Med. Sci.* 1957, Apr., v. 35, Pt. 2, 187–91. [13 refs.]

"*Boeckella minuta* is shown to be a suitable host for the procercoid stage of *D. latus*. *Gladioferens brevicornis* can also be infected, but no mature procercoids were found in the material available. Both these genera belong to the same order (Calanoida) as *Diaptomus*, the vector of *D. latus* in the Northern Hemisphere.

"Species of the order Cyclopoida were rarely infected with procercoids of *D. latus* and those procercoids which reached the body cavity seemed to be in unfavourable conditions and many were dead.

"Reasons are given for believing that Dibothriocephalid worms from dogs in New South Wales, which were previously reported to be *D. latus*, belong to the genus *Spirometra*."

Kaipainen, W. J. & Ohela, K. **Urinary Excretion of Radiovitamin B-12 in Pernicious Tapeworm Anaemia.** *Ann. Med. Intern. Fenniae.* Helsinki. 1957, v. 46, No. 2, 49–52.

"The writers found that the urinary excretion of radioactive vitamin B-12 (Schilling test) in pernicious tapeworm anaemia patients increases if radioactive vitamin B-12 is given simultaneously with intrinsic factor. The writers regarded the result as indicating that in the pathogenesis of tapeworm anaemia a disturbance in the action of intrinsic factor is of significance, as is the case also in pernicious anaemia."

See also p. 1359. Petrovický, Generalisovaná cysticerkosa a současná infekce toxoplasmatická. [**Generalized Cysticercosis accompanied by *Toxoplasma* Infection**]

Wainwright, J. *Coenurus cerebralis* **and Racemose Cysts of the Brain.** *J. Path. & Bact.* 1957, Apr., v. 73, No. 2, 347–54, 8 figs. on 4 pls. [20 refs.]

"A human case of *Coenurus cerebralis*, the larval form of the dog tapeworm *Multiceps multiceps*, is described. The cyst developed in the eye of an African, who became blind slowly over a period of 6 months.

"Four cases of racemose or grape-like cysts of the basal subarachnoid space and ventricles are described and the identity of the condition is discussed. Free-floating cysts, found in the ventricles or subarachnoid space, have a parasitic wall consisting of an outer eosinophilic cuticular layer and an inner cellular germinal layer. It is emphasised that the majority of cysts are sterile, and these racemose conditions may be caused either by *Coenurus cerebralis* or by *Cysticercus cellulosae*; differentiation depends upon the finding of non-sterile cysts.

"Racemose cysts may lead to the development of hydrocephalus by interference with the flow of cerebrospinal fluid either in the ventricles or in the subarachnoid space."

[See also this *Bulletin*, 1955, v. 52, 913; 1956, v. 53, 624.]

Rausch, R. **Studies on the Helminth Fauna of Alaska. XXX. The Occurrence of *Echinococcus multilocularis* Leuckart, 1863, on the Mainland of Alaska.** *Amer. J. Trop. Med. & Hyg.* 1956, Nov., v. 5, No. 6, 1086–92, 5 figs. [13 refs.]

"*Echinococcus multilocularis* Leuckart, 1863 (syn. *E. sibiricensis* Rausch and Schiller, 1954), whose larva causes alveolar hydatid disease in man, is reported for the first time from continental North America. The adult cestodes were collected from foxes at four localities in arctic Alaska, and also from Nunivak Island, which lies off the western coast of Alaska near the delta of the Kuskokwim River. *E. multilocularis* is

apparently widely distributed in Alaska, and may be expected to occur wherever the predator-prey relationship existing between the arctic and red foxes and microtine rodents, particularly the brown lemming, favors completion of its life cycle.

"The controversy of the past regarding the identity of the cestode causing alveolar hydatid disease is now clarified by the recognition of the coexistence of two species, *E. granulosus* and *E. multilocularis*, which differ in host-relationships and morphological characteristics. These species, however, are known to be sympatric only in boreal regions, the distribution of *E. multilocularis* being restricted by the occurrence of suitable intermediate hosts (rodents of the genera *Microtus*, *Clethrionomys*, and *Lemmus*).

"Although *E. multilocularis* is known only from parts of Alaska having an abundant mammalian fauna, it is believed that conditions in southern Canada and the United States are favourable enough to permit its becoming established, should it be introduced via infected dogs from the north."

Begg, N. C., Begg, A. C. & Robinson, R. G. **Primary Hydatid Disease of the Brain—its Diagnosis, Radiological Investigation, Treatment and Prevention.** *New Zealand Med. J.* 1957, Apr., v. 56, No. 312, 84–98, 19 figs. on 12 pls. [39 refs.]

20 cases of cerebral hydatid disease occurring in man from 1873 up to 1956 in New Zealand are described. 5 of these were investigated and treated by the authors. Most of these 20 infections occurred in children in rural areas in the South Island, where they are as frequent as neoplasms. The clinical manifestations were those of space-occupying lesions in appropriate sites. Casoni tests and complement-fixation tests were unreliable in infection with primary cysts. The cysts are usually fertile and it is desirable to remove them unruptured.

It has been said that hydatid cysts are as old as the patient and since cerebral disease is fatal unless treated it gives a more accurate indication of the incidence than symptomless cysts in other organs. The 8 cases of cerebral hydatid infection which have occurred in New Zealand since 1951 would probably correspond to more than 200 cases of infection in other organs. This sharp increase corresponds to the rise in the incidence of infection in sheep livers from about 50% in 1936 to about 80% in 1956.

A New Zealand farmer relies on the dosing of dogs with Arecoline as the key control method, but the thousands of eggs liberated in the faeces by this measure may live for months on the pasture and, in a limited experiment, regular dosing every 2 months had no effect on the rate of infection with hydatid in lambs. In Iceland where transmission is now said to have ceased and "the disease is probably completely extinct" the campaign hinged on preventing the dogs from eating raw offal, and the dogs were dosed only once every year.

In New Zealand most of the slaughtering is done on the farm and the liver, by tradition, is fed uncooked to the dog. A weatherproof and sturdy boiler with a standard volume of water and fuel which will boil each liver for 30 minutes is suggested and legislation should be brought in to prevent dogs from entering abattoirs and freezing works. It is unlikely that animals dying of natural causes act as a source of infection since dogs rarely eviscerate an intact carcass. Nevertheless, on general considerations the incineration of the carcases of such animals should be encouraged. Ready disposal is possible by burning the animal in its own fat and 1 bottle of Diesel oil in a modified 44-gallon oil drum. Dogs should be adequately fed on processed food and chained at night. To encourage these measures a bonus might be given to the farmer for every sheep free from hydatid disease. The paper is excellently illustrated with radiographs and photographs and a diagram of the appliance for treating animal viscera. *W. E. Kershaw*

Garabedian, G. A., Matossian, R. M. & Djanian, Aida Y. **An Indirect Hemagglutination Test for Hydatid Disease.** *J. Immunology.* 1957, Apr., v. 78, No. 4, 269–72. [33 refs.]

The authors describe the results of using "indirect hemagglutination tests" for the diagnosis of hydatid disease in man. The techniques employed in the test, which is a new one, are fully described in the paper. Each of the 50 samples of blood used had been obtained from a patient in whom the presence or absence of hydatid infection had been established beyond any reasonable doubt. The serum from each patient was tested by two methods of haemagglutination, the results being expressed as the average of the two determinations. These results were then compared with those obtained when a complement-fixation test was used, the technique of which has already been described by one of the authors [this *Bulletin*, 1956, v. 53, 1329].

The authors' summary is as follows:—

"By the employment of complement fixation and indirect hemagglutination tests 50 serum samples obtained from patients with hydatid disease and other conditions were tested. Of the 16 serum samples collected from hydatid disease patients positive results were obtained in 13 (81·25%) in indirect hemagglutination tests and in 11 (68·75%) in complement fixation tests. Of the 34 serum samples obtained from patients with other than hydatid disease the number of positive reactors was zero in indirect hemagglutination tests, and 2 (5·88%) in complement fixation tests.

"The results of the limited number of determinations indicate that indirect hemagglutination is a more sensitive and more specific serologic diagnostic procedure for hydatid disease than is complement fixation. Furthermore, it is easier to run than the complement fixation test and is less expensive." *R. M. Gordon*

Roche, M., Enriqueta Perez-Gimenez, Maria, Layrisse, M. & di Prisco, Estela. **Study of Urinary and Fecal Excretion of Radioactive Chromium Cr^{51} in Man. Its Use in the Measurement of Intestinal Blood Loss associated with Hookworm Infection.** *J. Clin. Investigation.* 1957, July, v. 36, No. 7, 1183–92. [19 refs.].

The haemorrhage of hookworm anaemia differs from that of other secondary haemorrhagic anaemias, such as those caused by haemorrhoids or menorrhagia. Much of the slowly oozing blood is digested in the intestines and reabsorbed so that the overall deficiency is rather less severe than the blood loss might warrant. The least easily reabsorbed part of the shed blood is, however, the iron. This element is not easily absorbed in its inorganic state and organic iron compounds such as haemoglobin are notoriously poor sources of iron. The iron loss is, therefore, the important factor in hookworm anaemia and an iron deficiency may present itself much earlier than any other deficiency.

The present paper sets out to determine the true blood loss in the intestines by labelling patients' red cells with radio-active chromium (^{51}Cr) and by measuring the excretion of ^{51}Cr in the faeces. It had first to be ascertained whether ^{51}Cr was likely to be reabsorbed from the intestinal tract and whether, if so absorbed, it would re-combine with the circulating erythrocytes in significant quantities. It was also relevant to find out how much of the ^{51}Cr would normally appear in the faeces when healthy people without intestinal haemorrhages had been injected with labelled erythrocytes.

The authors established that in normal people injected with labelled red cells almost 100% of the ^{51}Cr reappeared in the urine. The average faecal excretion was 1·27 ml. of "blood" per day. They also gave labelled erythrocytes to human subjects through a duodenal tube and recovered about 97% of the administered radio-activity in the faeces and only 2% from the urine. This indicated that the reabsorption of radio-active chromium would be negligible when labelled red cells had found their way into the intestines.

Having established these important controls, the authors were able to estimate the total loss of blood per day per patient and also per day per hookworm. There was no close relation between the amount of blood lost and the number of hookworms. Thus, 1 patient who harboured at least 509 worms (*Necator americanus*) bled 7·3 ml. per day whereas another with 609 hookworms (*N. americanus*) was calculated to lose 15·4 ml. per day. The authors found that patients with pure *N. americanus* infection lost, on the average, 0·03 ml. of blood per worm per day and from examining mixed infections they interpolate for *Ancylostoma duodenale* the figure of 0·2 ml. of blood per worm per day. The range of blood loss in 21 patients ranged from 2·0 (*i.e.* normal) to 251 ml. per day: the latter value was found in a 24-year-old man with a mixed *Ancylostoma duodenale* and *Necator americanus* infection from

whom 3,534 worms were recovered. The amount of blood lost per day per million ova was on the average 2·0 ml. for pure *Necator* infections. For practical purposes the authors give the following average figure: 2·74 ± 1·50 ml. blood loss per day per thousand *Necator* ova per gramme of faeces. *H. Lehmann*

Bird, A. F. **Chemical Composition of the Nematode Cuticle. Observations on Individual Layers and Extracts from these Layers in *Ascaris lumbricoides* Cuticle.** *Exper. Parasit.* New York. 1957, July, v. 6, No. 4, 383–403, 5 figs. [Numerous refs.].

Passey, R. F. & Fairbairn, D. **The Conversion of Fat to Carbohydrate during Embryonation of *Ascaris* Eggs.** *Canadian J. Biochem. & Physiol.* 1957, July, v. 35, No. 7, 511–25, 1 fig. [43 refs.].

Zaaijer, J. Aandoeningen van de galwegen door ascariden. [**Ascariasis of the Biliary Ducts**] *Nederl. Tijdschr. v. Geneesk.* 1957, July 27, v. 101, No. 30, 1395–6.

The English summary appended to the paper is as follows:—

"In two cases, symptoms suggestive of cholelithiasis were due to infestation of the biliary ducts with Ascaris. Probably the same condition may sometimes be responsible for the so-called post-cholecystectomy syndrome. The presence of Ascaris eggs in stools and gall combined with X-ray evidence of dilated biliary ducts in cases of biliary disorder, suggests the presence of Ascaris in the biliary ducts."

Correa Henao, A. Lesiones por *Ascaris lumbricoides* erraticos. [**Aberrant Lesions caused by *Ascaris lumbricoides***] *Rev. Latino-americana Anatom. Patol.* Caracas. 1957, Jan.–June, v. 1, No. 1, 5–14, 4 figs. on pl.

The English summary appended to the paper is as follows:—

"Nine cases of aberrant lesions produced by eggs of Ascaris lumbricoides are described. In 5 cases diagnosis was made in liver biopsies, in 2 from peritoneal biopsies, 1 in autopsy material and in 1 by clinical observation without biopsy. A previous case having similar granulomatous lesions was interpreted by other pathologists and parasitologists as probable coccidioidal, paragonimal or schistosomiasis granulomas, helminth eggs without stating that they were of ascaris.

"Diagnostic problems arise as the eggs lose their capsules and become unidentifiable. It is believed that the eggs are left in the tissues by errant females.

"Similar lesions were experimentally produced in guinea pigs."

Aiken, D. W. & Dickman, F. N. **Surgery in Obstruction of Small Intestine due to Ascariasis.** *J. Amer. Med. Ass.* 1957, July 20, v. 164, No. 12, 1317–23, 7 figs. [14 refs.]

"Ten patients with intestinal obstruction due to ascariasis were seen. Seven came to surgery, and three died before surgery could be performed. With the exclusion of one patient in whom the obstruction was partial, the mortality from complete obstruction by ascarides was 33%. A bolus of ascarides has a characteristic radiologic appearance, apparently not previously described. Enterotomy for this condition, perhaps even in complete obstruction, should become increasingly unnecessary if piperazine (Antepar) citrate is given by nasogastric tube after only a few hours of treatment with suction. None of the 10 patients received such medical treatment.

"Resection of the obstructed intestine, with double enterostomies to be closed later, is recommended in cases in which the intestinal wall is dilated and thinned or in which there is peritonitis. The use of a primary anastomosis in such severe cases of Ascaris lumbricoides infestation is not good, paralleling current precepts in resection for severe cases of intussusception in children and infants."

Ninane, G., Brakel, J. & de Coster, P. A propos de l'emploi de l'adipate de pipérazine pour le traitement de masse de l'ascaridiose. [**Piperazine Adipate in the Mass Treatment of Ascariasis**] *Ann. Soc. Belge de Méd. Trop.* 1957, Apr. 30, v. 37, No. 2, 279–84.

The English summary appended to the paper is as follows:—

"The authors describe a therapeutic method for a mass treatment of ascariasis, based on the use of a single dose of piperazine adipate: 200 mg per kilogram given during the afternoon, followed by a castor-oil purge the next morning. One can anticipate 94% completely cured. The treatment is without danger and modestly priced."

Fan, P. C., Hsu, J. & Liu, J. C. **Survey of Intestinal Helminths and Treatment of Ascariasis with Piperazine Citrate among School Children and Students in Northern Taiwan, China.** Reprinted from *Nat. Defense Med. Center Selected Papers.* Taipei. 1956, 12–22, 1 map. [25 refs.]

"A single examination by centrifugation concentration technique from each of 1,701 students and children: (605 students in Normal University/Normal School, 752 children in Primary School and 344 Pre-school children in Kindergarten in Taipei city) was carried out for the purpose of determining the type and incidence of intestinal helminthiasis.

"The results were as follows:—Ascaris, 24·6% in students, 31·5%

in school children and 23·3% in pre-school children; Hookworm, 6·3%, 0·8%, and 0·3% respectively; Trichuris, 15·7%, 14·5% and 7·3% respectively; Enterobius, 2·4% in school children and 1·4% in pre-school children.

"Incidence of intestinal helminths was higher in Taiwan children/students than in those who came from the mainland or of mainland parentage (40·9% against 34·1%).

"Four hundred and eighteen cases of Ascariasis were treated with one-day course of Piperazine citrate, but only 223 were available for re-examination, two weeks after treatment. The cure rate was 78·0 per cent, and 3·1 per cent of cases showing reaction was observed.

"Sixteen cases of Ascariasis and 31 cases of Hookworm infection were treated with Hexylresorcinol (crystoid), the cure rate was 75·0 per cent and 45·2 per cent respectively. No reactions were observed."

Bruton, O. C. & Jaffurs, W. J. **Larval Granulomatosis. Diagnosis by Needle Biopsy of the Liver.** *U.S. Armed Forces Med. J.* 1957. July, v. 8, No. 7, 1022–6, 3 figs.

A variety of worms unadapted to man may, on the accidental introduction of their ova into his alimentary canal, pass a brief and uneasy larval phase in his tissues. Among them, the dog and cat ascarids are the chief offenders, and this article reports the occurrence of widespread visceral granulomatous lesions in a child, which were due to the larvae of *Toxocara canis*. The condition may be suspected in a person of unusual habits, such as a dirt-eater as in this instance, or in one having much contact with the excreta of animals, in whom a high absolute eosinophilia is associated with hepatosplenomegaly or with symptoms suggesting invasion of the lungs, brain, myocardium or eye. An extremely high gamma globulin concentration is usually to be found.

A neglected child aged 2 years, from a squalid home, was brought to hospital with symptoms of acute bronchitis, and with gross enlargement of both liver and spleen. A differential leucocyte count revealed 65% eosinophils in 48,000 leucocytes per cmm. and a total plasma protein of 10·2 gm. per 100 ml. to which gamma globulin contributed 33·8% (3·5 gm.). Liver biopsy showed miliary granulomata, and on sectioning the whole specimen rare larvae of *Toxocara canis* were recognized. No specific treatment was attempted, but the child was re-examined 1 year later, when both liver and spleen were found to be reduced in size, though still enlarged, and eosinophils constituted 45% of 18,200 leucocytes per cmm.

The authors suggest that larval granulomatosis may escape recognition under the guise of eosinophilic leukaemia, Loeffler's syndrome, familial eosinophilia, retinoblastoma or endopthalmitis.

[Since the child's habits and environment had not changed during

the intervening year it is possible that his improvement was due to a developing immunity to re-invasion and to the dying-out of the larvae already established in his tissues.] *J. H. Walters*

Edeson, J. F. B., Hawking, F. & Symes, C. B. **The Periodicity of Microfilariae. VI. The Response of Microfilariae of *Wuchereria malayi* and *W. bancrofti*, Pacific Type, to Various Stimuli.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, July, v. 51, No. 4, 359–65, 1 fig.

This paper describes a continuation of previous work on the periodicity of microfilariae [this *Bulletin*, 1957, v. 54, 726]. An opportunity was taken to investigate the reactions of the microfilariae of *Wuchereria malayi* and of *W. bancrofti*, non-periodic Pacific type, to stimuli which affected African *W. bancrofti*.

The microfilariae of *W. malayi* (Pahang strain, East Malaya) behaved similarly to those of African *W. bancrofti*. That is to say there was a fall in the number in the peripheral blood (presumably accumulation in the lungs) when the patient breathed oxygen or took muscular exercise, but there was no marked change when he breathed carbon dioxide. The microfilariae of the non-periodic Pacific type of *W. bancrofti* (Fiji strain) differed from those of African *W. bancrofti*, in that oxygen given to the patient to breathe caused a slight rise in the microfilarial count instead of a marked fall; the response to exercise was the same as with the African type.

It is tempting to correlate this difference of response to oxygen of the Pacific *W. bancrofti* with its non-periodic nature, but there are too many other factors to be considered for the correlation to be a simple one. *F. Hawking*

Rachou, R. G. & Lacerda, N. B. Da transmissão da filariose bancroftiana em Manaus (Amazonas). [**Transmission of *Wuchereria bancrofti* Infections in Manaus, Amazonia, Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Apr., v. 8, No. 2, 369–71.

The English summary appended to the paper is as follows:—

"An epidemiological survey of human filariasis was made in Manaus, State of Amazonas, in 1954. Some of bancroftiasis, revealed by this survey, were apparently autochthonous, although among 3,815 dissected specimens of *Culex pipiens fatigans*, captured in the same houses where blood samples had been collected, no infective larvae of *W. bancrofti* were encountered.

"A series of indoor captures in the district of the town, São Raimundo, where the totality of probable autochthonous carriers lived, has been planned and executed in 1955, with the dissection and examination of

the captured mosquitoes. In 25 weeks, 12,656 specimens of *C. p. fatigans* were collected; 9,755 were dissected; 134 harbored larvae of *W. bancrofti* and 4, infective larvae. These findings proved the transmission of bancroftiasis in Manaus, a recent and small focus, the first to be found in the interior of the country, since all known foci of bancroftiasis in Brazil occur on the coast."

Jachowski, L. A., Jr. **Filariasis in American Samoa. VI. Survey of Swain's Island.** *Proc. Helminthological Soc. of Washington.* 1957, Jan., v. 24, No. 1, 26–9, 1 fig.

"Non-periodic *Wuchereria bancrofti* is endemic on Swain's Island occurring in persons born there and those born elsewhere. Of 110 persons examined 15 (13·6 per cent) had microfilaremia and one had elephantiasis. Adult males appear to suffer the greatest exposure risk.

"*Aedes polynesiensis* is abundant and appears to be the vector. Of 105 mosquitoes dissected 3 harbored developing filarial larvae. One of these had infective larvae in its mouthparts.

"Suggestions for control of filariasis on Swain's Island include the burial of coconut waste from copra operations and the periodic treatment of the entire population with suitable antifilarial drugs."

Danaraj, T. J., da Silva, L. S. & Schacher, J. F. **The Filarial Complement-Fixation Test in Eosinophilic Lung (Tropical Eosinophilia). A Preliminary Report.** *Proc. Alumni Ass. Malaya.* 1957, June, v. 10, No. 2, 109–16. [27 refs.]

It has been suggested that "tropical eosinophilia" might be due to some form of filarial worm [this *Bulletin*, 1945, v. 42, 837; 1954, v. 51, 1082]. In work to be reported elsewhere, the authors successfully treated 110 patients with diethylcarbamazine [see also *ibid.*, 1957, v. 54, 490], but there was never any evidence that filariasis was present in them. The present patients were 12 Indians and Chinese at the General Hospital, Singapore, who were free from filariasis. When first tested their sera showed a positive complement-fixation reaction in titres of 1 in 40–1 in 160, with an antigen prepared by alcoholic extract of *Dirofilaria immitis* [*ibid.*, 1956, v. 53, 1464]. After treatment with diethylcarbamazine the reaction became negative in about 27–61 days and the eosinophilia gradually diminished. In a control group of 30 other persons the reaction was negative. In 10 cases of bancroftian filariasis with microfilariaemia the reaction was positive in titres of 1 in 5–1 in 20 in 5 cases, and negative in 5 cases; in 10 patients with microfilariae of *Wuchereria malayi* in the blood, only 2 were positive. In 9 dogs infected with *D. immitis* the reaction was positive at 1 in 5–1 in 20 in 4 cases and negative in the other 5. The test was negative in 10

patients with mild eosinophilia and pulmonary symptoms who were not considered to have eosinophilic lung or filariasis. In further work the sera of 6 patients with eosinophilic lung were tested with an antigen obtained by alcoholic extract of *Ascaris lumbricoides*, but all were negative. In the present state of our knowledge, it seems plausible that eosinophilic lung may be due to infection with some filarial infection of non-human origin, which cannot establish itself completely in the abnormal human host, but which produces marked cellular and serological responses. This possibility is discussed at length.

F. Hawking

Danaraj, T. J. **Tropical Pulmonary Eosinophilia.** [Correspondence.] *Brit. Med. J.* 1957, July 20, 161–2.

In this letter the author refers to the findings in the above paper and in previous work by himself [this *Bulletin*, 1952, v. 49, 316]. He reaffirms that blood examinations in his patients with eosinophilic lung have been consistently negative. Since, in addition, true eosinophilic lung is not accompanied by the classical clinical features of filariasis, and hypereosinophilia is not a usual manifestation of filariasis, there are reasonably distinct clinical pictures in the two diseases. Nevertheless, the response to diethylcarbamazine and the serological findings lend support to the theory of a filarial infection, not necessarily human, being concerned in the aetiology of eosinophilic lung.

H. J. O'D. Burke-Gaffney

Galliard, H. Prophylaxie de la filariose à *Wuchereria bancrofti* à Tahiti. [**Prophylaxis of** *Wuchereria bancrofti* **Filariasis in Tahiti**] *Ann. Parasit. Humaine et Comparée.* 1957, Apr.–June, v. 32, No. 3, 348–51.

See also this *Bulletin*, 1949, v. 46, 1064; 1953, v. 50, 738.

See also p. 1370, Gentry & Hubert, **Resistance of** *Culex quinquefasciatus* **to Chlorinated Hydrocarbons on Okinawa.**

Blanc, M. & d'Aubenton, F. Compte rendu sommaire d'une seconde mission hydrobiologique en Haute-Volta (15 février–17 avril 1957). [**Summarized Results of a Second Hydrobiological Enquiry in Upper Volta in 1957**] *Méd. Trop.* Marseilles. 1957, May–June, v. 17, No. 3, 412–15.

Previous studies [this *Bulletin*, 1956, v. 53, 1160; 1957, v. 54, 76] having indicated that DDT used to kill the larvae of *Simulium* was less toxic to fish than benzene hexachloride, new studies were initiated. They were carried out on a tributary of the Black Volta near Bobo-Dioulasso

with both suspensions and emulsions of DDT. The emulsion, 17% in strength, was distributed in a simple manner from cans with holes pierced in the bottom and suspended over the stream, preliminary trials with fluorescein having shown the best sites at which to put the cans to ensure even distribution.

A dose of 1·5 to 3 parts DDT per million parts of water proved fully effective in destroying the larvae though not the pupae of *Simulium*, several consecutive treatments being necessary to rid the stream of the insects. There was no adverse effect on fish in running water but in some stagnant parts of the river a concentration of emulsion caused the death of a few. This effect is attributed to the kerosene solvent and not to the DDT itself. Methods of avoiding it are discussed and it is concluded that a non-toxic oil solvent should be used

G. Macdonald

Fan, P. C., Hsu, J. & Liu, J. C. **Studies on Oxyuriasis. II. Two New Types of Perianal Swab for Oxyuriasis Survey, Comparison of Results with NIH Cellophane Swab.** Reprinted from *Chinese Med. J.* Taipei. 1955, Dec., v. 2, Nos. 3/4, 183–96, 8 figs. [33 refs.] **III. Incidence of Oxyuriasis and Efficacy of its Treatment with Anthelmintics in Orphans in Northern Taiwan, China.** *Ibid.* 1956, Dec., v. 3, No. 4, 182–91. [35 refs.]

Jenkins, M. E. **Enterobiasis in Children. The Use of Zinc Oxide Ointment Locally as a Therapeutic Agent.** *J. Pediatrics.* St. Louis. 1957, June, v. 50, No. 6, 714–15, 1 fig.

On the assumption that breaking the cycle of self-reinfestation with *Enterobius* by preventing the female worms from laying eggs on the perianal surface would effect a cure, the author treated 25 infected children and their immediate families with zinc oxide ointment. This was applied in 1/8 inch thickness over the rectal orifice and perianal folds 3 times daily and at bedtime for 21 days. 19 other infected children were treated with Antepar syrup (piperazine citrate) and 30 were untreated. After 25 days 3 consecutive slides were taken and if all 3 were negative for *Enterobius*, cure was assumed.

On this criterion 20 of the 25 treated with zinc oxide ointment were regarded as cured, compared with 17 of the 19 receiving piperazine. 7 of the 30 untreated children had spontaneous cures. Thus, four-fifths of the children were cured by the zinc oxide ointment and rather more by piperazine.

Since zinc oxide has no known toxic effect against *Enterobius* it is suggested that it, as well as any other non-irritating ointment, might be used locally as an adjunct to established treatments of *Enterobius* infection.

[The numbers treated are very small and hardly justify estimating results as "80 per cent" and "89·5 per cent".]

H. J. O'D. Burke-Gaffney

Ricci, M. & Corbo, S. Sull'azione dell'adipato di piperazina verso *E. vermicularis* e *A. lumbricoides*. [**The Action of Piperazine Adipate on** *E. vermicularis* **and** *A. lumbricoides*] *Rendiconti Istituto Superiore di Sanità*. Rome. 1957, v. 20, Pt. 3, 258–66. [12 refs.]

The English summary appended to the paper is as follows:—

"The authors have treated with piperazine adipate 335 children from 6 to 12 years of age affected by enterobiasis. The drug was administered in solution, as suspension and in tablets: 1·8 g of active substance *pro die* for a period from 2 to 5 days.

"Among the treated cases only 252 have regularly followed the treatment and have undergone routine controls. No substantial differences were observed in the activities of the various formulations. The following percentages of cured cases were obtained: 70·37% on 27 children treated for 2 days; 87·18% on 39 children treated for 3 days; 95·10% on 102 children treated for 4 days; 94·05% on 84 children treated for 5 days. The majority of non-cured subjects showed a great reduction in the number of pinworm eggs.

"36 individuals affected by ascariasis have been treated for a single day with about 4 g of piperazine adipate in solution. The following day, 20 g of sodium sulphate was administered. All patients have passed from 2 to 37 worms; in 94·44% of patients no eggs could be found in the stools after treatment.

"24 individuals who were parasitized by *T. trichiura* also showed the disappearance of eggs in 12·50%; the others showed only a reduction in the number of eggs.

"Piperazine adipate showed no effect on two cases of *H. nana* infection."

Goldberg, E. **Studies on the Intermediary Metabolism of** *Trichinella spiralis*. *Exper. Parasit.* New York. 1957, July, v. 6, No. 4, 367–82, 2 figs. [24 refs.]

Chalupský, J. Trichinelosa u potkanů a krys. [**Trichinellosis in Wild Rats** (*Rattus norvegicus* **Erxl.) and Rats** (*Rattus rattus* **L.**)] *Československ. Epidemiol., Mikrobiol., Imunol.* Prague. 1957, v. 6, No. 4, 281–4. [26 refs.]

The English summary appended to the paper is as follows:—

"230 wild rats (Rattus norvegicus Erxl.) and rats (Rattus rattus L.)

were examined on trichinellosis (209 wild rats, 21 rats). The examination was done by the compressoric (90%) and digestive (10%) method. The majority of studied animals were from Prague and its nearest environment (181 specimens), the others were from different parts of Bohemia. The result of the examination was completely negative."

MELTZER, L. E. & BOCKMAN, A. A. **Trichinosis involving the Central Nervous System. Treatment with Corticotropin (ACTH) and Cortisone.** *J. Amer. Med. Ass.* 1957, Aug. 3, v. 164, No. 14, 1566–9. [18 refs.]

"Trichinosis commonly involves the central nervous system. Such involvement may produce either nonspecific neurological signs (headaches, neck stiffness, and decreased deep tendon reflexes) or actual focal cerebral damage, which may be of a protean type. In a case of focal cerebral damage due to Trichinella spiralis, a dramatic, prompt improvement was noted after treatment with corticotropin (ACTH) and cortisone. The patient recovered completely. Much of the clinical picture of trichinosis suggests an antigen-antibody reaction or toxic and allergic elements. The rapid recovery with reversal of focal neurological damage after steroid therapy may be related to these aspects."

[See this *Bulletin*, 1955, v. 52, 679.]

DEFICIENCY DISEASES

DE MEIRA, M. T. V. Contribuição para o conhecimento do estado de nutrição da população de Cabo Verde. III—Inquérito alimentar na Ilha de S. Vicente (Cabo Verde). [**Nutritional Study of the Population of Cape Verde. III. Dietary Survey in St. Vincent**] *Anais Inst. Med. Trop.* Lisbon. 1956, Dec., v. 13, No. 4, 679–88, 7 figs. on 4 pls.

The English summary appended to the paper is as follows:—

"Based in the results of a familiar type inquest, the author shows in this work the dietetic table of ten families including 63 persons belonging to the popular class of the chief town Mindelo, in St. Vincent, Cape Verde Islands.

"The author says that the nutrition condition of this island is very similar to the table found in the Sal Island (1949), and that such analogy should be compared with another table reported by the same author in preceding works concerning the somatometric values of the same populations."

Barbosa, J. C. L. Contribuição para o conhecimento do estado de nutrição da população de Cabo Verde. IV. Inquérito realizado em S. Nicolau em 1954. 1ª Parte. [**Nutritional Study of the Population of Cape Verde. IV. Survey in St. Nicholas**] *Anais Inst. Med. Trop.* Lisbon. 1956, Dec., v. 13, No. 4, 689–809, 31 graphs. [40 refs.]

The English summary appended to the paper is as follows:—

"The author refers to the results of a nutritional survey realized in 1954 at St. Nicholas Island (Ilha de S. Nicolau) in Cape Verde (Cabo Verde).

"The survey included a clinical, a laboratory and lastly a nutritional part.

"References are still made to the nosographic aspects of that island which may be of interest for the knowledge of the nutritional state of the population and of the salubrity, and economical and social aspects."

South Pacific Commission. Nouméa, New Caledonia. **Chemical Composition of South Pacific Foods. An Annotated Bibliography.** [Peters, F. E.] *Technical Paper No. 100.* 1957, Jan., v + 104 mimeographed pp., 1 map.

Gordillo, G.; Soto, R. A.; Metcoff, J.; Lopez, Elizabeth; Garcia Antillon, L.; Frenk, S.; Gómez, F.; Ramos-Galván, R.; Cravioto, J.; Janeway, C. A.; Gamble, J. L. **Intracellular Composition and Homeostatic Mechanisms in Severe Chronic Infantile Malnutrition. III. Renal Adjustments** [Gordillo, Soto, Metcoff, Lopez & Garcia Antillon]. *Pediatrics.* Springfield, Ill. 1957, Aug., v. 20, No. 2, 303–16, 5 figs. [31 refs.] **IV. Development and Repair of the Biochemical Lesion** [Metcoff, Frenk, Gordillo, Gómez, Ramos-Galván, Cravioto, Janeway & Gamble]. *Ibid.* 317–36, 13 figs. [30 refs.]

Gómez Santos, F., Ramos Galván, R., Cravioto, J. & Frenk, S. Metabolismo del nitrógeno en niños con desnutrición severa crónica. Absorción y retención del nitrógeno de proteínas de alto valor biológico. [**Nitrogen Metabolism in Children with Severe Chronic Malnutrition. Absorption and Retention of the Nitrogen of Proteins of High Biological Value**] *Rev. Invest Clin.* 1957, Jan.–Mar., v. 9, No. 1, 41–54. [29 refs.]

The English summary appended to the paper is as follows:—

"The results of serial metabolic balances in 9 children with severe chronic, third degree malnutrition are presented.

"In all the stages of recovery, positive nitrogen balances were obtained. These were quantitatively independent of caloric intake. There was a highly significant positive relation between ingestion and absorption, ingestion and retention, and absorption and nitrogen retention.

"These findings are discussed."

Trowell, H. C. & Simpkiss, M. J. **Intramuscular Iron in the Treatment of the Anaemia associated with Kwashiorkor.** *Lancet.* 1957. Aug. 10, 265–7. [10 refs.]

"The literature on anaemia associated with Kwashiorkor has not shown that the haemoglobin improves with high-protein diets.

"In Mulago Hospital, Uganda, the haemoglobin content of the blood may occasionally deteriorate in children who are improving in every other respect on a high-protein, high-calorie diet.

"17 young children with kwashiorkor were treated with injections of intramuscular iron and a high-protein, high-calorie diet. 4 were excluded from the enquiry for various reasons. Of the remaining 13, 10 of the 11 anaemic patients responded promptly and well."

[A diet that is low in protein is very often also poor in iron. The authors state "In our experience it is uncommon to find uncomplicated cases of kwashiorkor, at least if patients are observed carefully." Most people would agree with this. In fact the anaemia often has multiple causes. In any case, treatment with intramuscular iron benefits the child with anaemia and involves no additional strain on the digestive system.]

Cicily D. Williams

HAEMATOLOGY

See also p. 1336, Roche *et al.*, **Study of Urinary and Fecal Excretion of Radioactive Chromium Cr^{51} in Man. Its Use in the Measurement of Intestinal Blood Loss associated with Hookworm Infection.**

Linhard, J., Mazaud, R. & Moissinac, J. État hématologique de l'Africaine dakaroise pendant la grossesse. [**Haematological Findings in African Women in Dakar during Pregnancy**] *Bull. Soc. Path. Exot.* 1957, Mar.–Apr., v. 50, No. 2, 321–36, 4 figs. on 4 pls. [22 refs.]

The authors examined 100 pregnant women in Dakar between the fifth and ninth month of gestation. They compared the haematological values found with normal values. 75 of these women were anaemic. In the majority the anaemia was mild and was considered to represent

only the normal haemodilution of pregnancy; the red cells were microcytic but there was no iron deficiency. 21 of the 100 women, *i.e.* 28% of the anaemic women, had a red cell count below 3,500,000/cmm. and a haemoglobin level below 10 gm.%. In these women the red cells were large, the mean corpuscular volume varying from 90 to 110 cu.μ but there was no hyperchromia. The authors point out that in these women a difference will be seen when the severity of the anaemia is judged by the red cell count or by the measurement of the haemoglobin level. With a macrocytic normochromic anaemia the red cell count is more likely to give a true indication of the severity of the restriction of red cell production. *H. Lehmann*

Massie, R. W. & Hartmann, R. C. **Albinism and Sicklemia in a Negro Family.** *Amer. J. Human Genetics.* 1957, June, v. 9, No. 2, 127–32, 2 figs.

"A negro family with four albinos, one with classical sickle cell anemia and three with sickle cell trait, is reported. The physical characteristics of negro albinos are discussed and contrasted with those seen in the caucasian albino. The present study demonstrates that if the hypothesis of simple Mendelian recessive inheritance in albinism is correct, absolute linkage between the genes for albinism and for sicklemia does not occur, but lesser linkage is possible."

Ingram, V. M. **Gene Mutations in Human Haemoglobin: the Chemical Difference between Normal and Sickle Cell Haemoglobin.** *Nature.* 1957, Aug. 17, v. 180, 326–8, 1 fig. [18 refs.]

Edington, G. M. **The Pathology of Sickle Cell Haemoglobin C Disease and Sickle Cell Anaemia.** *J. Clin. Path.* 1957, May, v. 10, No. 2, 182–6.

In Southern Ghana there is a high incidence of haemoglobin S (18%) and of haemoglobin C (12%) [this *Bulletin*, 1954, v. 51, 1188]. It is therefore not surprising that numerous people were seen who were heterozygous for the genes for haemoglobins S and C. The purpose of this communication is to describe the post-mortem findings in 5 patients who had died of sickle-cell-haemoglobin-C disease (2 of the 5 being described in an Addendum) and to compare these observations with those made in sickle-cell anaemia. An extensive study of the pathology of sickle-cell anaemia (SS) has been previously published by the author [*ibid.*, 1955, v. 52, 925].

The post-mortem findings bear out what the clinical observations suggest. Sickle-cell-haemoglobin-C disease is a modified milder sickle-cell anaemia. The degree of siderosis is much less and the spleen does

not contain the siderofibrotic nodules which are so typical of advanced sickle-cell anaemia. There are three factors present in both diseases but less severe in sickle-cell-haemoglobin-C disease:— (1) haemolysis; (2) segregation of the red cells in the spleen; (3) intravascular agglutination of sickle cells. The last finding which represents the clinical crisis is probably precipitated by infection. *H. Lehmann*

Song, Y. S. **Hepatic Lesions in Sickle Cell Anemia.** *Amer. J. Path.* 1957, Mar.–Apr., v. 33, No. 2, 331–51, 11 figs. on 6 pls. [20 refs.]

The author states that because of the numerous vascular anastomoses in the liver, lesions resulting from engorgement of the vessels and sinusoids with sickled red blood cells may have a special significance for the pathology of the liver in sickle-cell disease. He studied 31 cases of sickle-cell anaemia which had been examined post mortem at the University of Tennessee in 1935–55. 13 of the patients were 24–45 years of age. There was evidence of cell damage in all livers and in 9 cases cirrhosis was present. The sinusoids were filled with sickled red blood cells or with hyaline thrombi—the result of haemolysis. In the capillaries there were agglutinated red cells forming thrombi and these appeared to be responsible for anoxaemic necrosis of the surrounding cells.

It is of interest that the author finds the 9 cirrhotic livers to be different from any others. The changes are of macronodular or post-necrotic type, which the author considers to be a unique manifestation of sickle-cell disease. The spleen varied greatly in size, and there was no consistent pattern relating the weight of the spleen to the duration of the disease. The following data are extracted from illustrative case histories given in the paper:

Age (years)	Spleen weight (gm.)
11	35
14	8
15	900
27	4
34	350
35	30

The author thinks that the lesions of the liver are related to at least five mechanisms: (1) the stagnation of the sickled red cells in the sinusoids; (2) the occlusion of blood vessels by agglutinated thrombi; (3) repeated blood transfusions causing haemochromatosis by increasing the amount of iron liberated on breakdown of haemoglobin; (4) increased haemolysis going on for a long time associated with an increased excretion and deposition of bilirubin; (5) a long standing severe anaemia.

[It is obvious to the reader that it will be very difficult to sort out which parts of the liver damage are unspecific consequences of a prolonged haemolytic anaemia and which the specific effect of intravascular and intrasinusoidal sickling. What is more, it will be difficult to be

sure how much of these intravascular and intrasinusoidal changes were present in life and how much of them occurred post mortem (see KIMMELSTIEL, *Amer. J. Med. Sci.* 1948, v. 216, 11). The reader will also ask himself whether the divergencies brought out in the case histories could not partly be explained on the assumption that some of the patients had been suffering from sickle-cell-haemoglobin-C disease and others from true homozygous sickle-cell anaemia. It is suggestive that so many of them were adults. This consideration applies particularly to the differences in age, in spleen weight and in degree of haemochromatosis. The reader might like to refer here to EDINGTON's comparison of the pathology of sickle-cell anaemia and sickle-cell-haemoglobin-C disease (see above).]

H. Lehmann

ADAMS, J. Q. **Sudden Death in Pregnancy due to the Sickle Cell Trait.** *Southern Med. J.* 1957, July, v. 50, No. 7, 898–901, 2 figs.

[The patient was suffering from eclampsia.]

HILKOVITZ, G. **Sickle-Cell Disease: New Method of Treatment. Preliminary Report.** *Brit. Med. J.* 1957, Aug. 3, 266–9, 2 figs.

The basic defect in sickle-cell disease is the formation of tactoids in the reduced red cells giving the sickle-cells their bizarre shape. Owing to this abnormal shape sickle cells tend to accumulate in small blood vessels, causing thrombotic phenomena, and are selected by the spleen for destruction which is the cause of a haemolytic anaemia. The author in his attempt to cure sickle-cell disease by an interference with the sickling phenomenon went back to the work of TOMLINSON and JACOB [this *Bulletin*, 1945, v. 42, 582]. These authors had washed the red cells from a case of sickle-cell anaemia and had re-suspended the cells in the patient's plasma afterwards. When they prepared sealed preparations from this reconstructed blood the sickling phenomenon no longer occurred. They concluded therefore that by washing the red cells an essential factor for sickling had been removed. As they also found that the addition of sodium cyanide or zinc acetate inhibited sickling in the blood of patients with sickle-cell anaemia, and as these 2 inhibitors are known to inhibit the enzyme carbonic-anhydrase, they concluded that on washing they had removed the carbonic-anhydrase system from the red cells. Unfortunately the author has not washed sickle-cells, added carbonic-anhydrase and seen whether this addition would restore the faculty of the red cells to sickle in sealed preparations.

The present paper brings a new approach to the problem by demonstrating the inhibition of sickling with carbonic anhydrase inhibitors both *in vitro* and *in vivo*. *In vitro* the carbonic-anhydrase inhibitor Diamox [acetazolamide] was added in a concentration of 5 mgm. per 100 ml. to freshly drawn blood from a patient with sickle-cell anaemia. A sealed

slide preparation contained virtually no sickle-cells after a 24-hour incubation at 37°C. whereas a control to which Diamox had not been added showed almost complete sickling. The reduction of haemoglobin requires the provision of a hydrogen ion from carbonic acid (H_2CO_3) and the carbonic-anhydrase inhibitor, by preventing the formation of H_2CO_3 from CO_2 and H_2O, would prevent this reduction. *In vivo* experiments were performed by giving a patient 2 mgm. Diamox per kgm. body weight. 1 hour later blood was taken by venepuncture and injected under a layer of sterile paraffin into a tube which contained 10% formol saline, the object being to fix the red cells in the shape they were in the circulating blood. Films were made and stained with eosin and the percentage of sickle cells among 3,000 red cells was counted under an oil immersion lens. In the untreated patient or in the patient who had not been treated for 48 hours with Diamox, 15·6% of the circulating cells were in sickled form. 1 hour after the administration of Diamox the percentage of sickle cells was only 8·9. This demonstration of the inhibition of sickling with a carbonic-anhydrase inhibitor both *in vivo* and *in vitro* may well be of interest to those intending to treat patients with sickle-cell anaemia and the author mentions that preliminary experiments along these lines have been encouraging. *H. Lehmann*

Singer, K., Josephson, A. M., Singer, Lily, Heller, P. & Zimmerman, H. J. **Studies on Abnormal Hemoglobins. XII. Hemoglobin S-Thalassemia Disease and Hemoglobin C-Thalassemia Disease in Siblings.** *Blood*. 1957, July, v. 12, No. 7, 593–602, 7 figs. [30 refs.]

"A family study is reported in which the simultaneous presence of C-thalassemia and S-thalassemia disease is noted. Marked interaction of the genes for the abnormal hemoglobins and for thalassemia is evident.

"The value of the accessory hemoglobins for the diagnosis of thalassemia minor is discussed.

"The Hb S + F pattern can no longer be assumed to be diagnostic of sickle cell anemia. Evaluation of all hematologic data and the family background of the patient may be necessary to rule out the presence of the thalassemia gene.

"A discussion of the genetics of the double heterozygous states for thalassemia and an abnormal hemoglobin is presented."

Pascher, F. & Keen, R. **Ulcers of the Leg in Cooley's Anemia.** *New England J. of Med.* 1957, June 27, v. 256, No. 26, 1220–22, 1 fig. [11 refs.]

"Cooley's anemia associated with leg ulcers may occur in the adult male as well as in the female and in a patient after splenectomy as well as in patients with splenomegaly.

"A high index of suspicion and appropriate hematologic studies are essential for a correct diagnosis since the ulcers are not attended by any pathognomonic features.

"Adequate local supportive dressings, properly applied, are essential in management.

"A combination of factors appears to be involved in the pathogenesis of these ulcers."

Copounis, A., Sapkas, A. & Oeconomidès, E. La splénectomie dans l'anémie érythroblastique méditerranéenne (maladie de Cooley). [**Splenectomy in Cooley's Anaemia**] *Bull. Acad. Nat. Méd.* 1957, v. 141, Nos. 21, 22 & 23, 501–8. [50 refs.]

VENOMS AND ANTIVENENES

Reid, H. A. **Antivenene Reaction following Accidental Sea-Snake Bite.** *Brit. Med. J.* 1957, July 6, 26–9. [28 refs.]

This is a fascinating personal case history of a bite by the sea-snake *Enhydrina schistosa*, in which the author emphasizes the allergic dangers of antivenene therapy and expresses his highly individual views on its employment, though this account does not suggest that his convictions were absolute.

E. schistosa produces an intensely neurotoxic venom, and the adult specimen which bit the author on the finger-tip yielded, after a short interval, 27 mgm. of dried venom, equivalent to some 14 human lethal doses. Local treatment in this case was limited to sucking the wound, and systemic therapy was initiated by an injection of 250 mgm. of cortisone 20 minutes after the bite. 30 minutes after the bite an intramuscular injection of 10 ml. of antivenene was administered, and this was repeated with hyaluronidase 5 minutes later. The antivenene was a concentrated polyvalent anti-colubrine and anti-viperine horse-serum, which was found to have no neutralizing powers against *E. schistosa* venom *in vitro*. The specific toxic effects of the venom were minimal, being limited to slight generalized muscular stiffness and weakness of 24 hours' duration. A severe serum reaction began to manifest itself on the 5th day, however, and on the 8th day a painful cervical and lumbar radiculitis developed: disability attributable to a lesion of the left 5th cervical nerve root persisted for one year.

The author cites many examples of bites in man by highly venomous snakes which resulted in toxic symptoms as negligible as his own, and

points out that such attacks are of a defensive nature, very different from those designed to paralyse and kill animals which form the snake's normal food. It is probable that such a defensive reflex does not usually evoke more than a token secretion of venom. He goes on to quote examples of anaphylaxis following the intravenous administration of antivenene [one such recent fatality in Dorset following the treatment of an adder bite will come to mind], and of later allergic effects. Radiculitis is not an uncommon sequel, the maximal effect usually falling on the 5th and 6th cervical roots, which have the greatest diameter relative to the size of the inter-vertebral foramina. Cortisone and prednisolone did little to relieve the symptoms of this lesion in the author's case, but recovery was ultimately complete.

The author expresses his opinion that the effects of antivenene therapy are worse, and may be even more dangerous, than those of the bite itself. [The abstracter does not feel that there is as yet sufficient evidence to justify the discarding of antivenene therapy, but it would seem wise to administer even concentrated serum by the intramuscular route, facilitating its absorption with hyaluronidase. He would call attention to the value of cryotherapy, especially in cases of cytotoxic viper bites, as reported by Stahnke *et al.* (this *Bulletin*, 1957, v. 54, 1119). This requires the rapid immersion of the bitten limb in melting ice for a period of 12 hours.] *J. H. Walters*

Ganatra, R. D., Dhopeshwarkar, G. A., Sheth, U. K. & Lewis, R. A. **Use of Hydrocortisone in Experimental Viper Venom Poisoning in Mice.** *Indian J. Med. Sci.* 1957, July, v. 11, No. 7, 493–5.

"The LD_{50} of viper venom in white mice has been determined. When the LD_{50} of venom and sufficient antivenin to neutralize one LD_{50} of venom were injected the mortality was approximately 57 per cent. The administration of 2 mg. per 20 grams of hydrocortisone alone, or with antivenin caused a reduction in mortality to approximately 17 per cent despite the fact that two LD_{50} of venom were injected."

[See also this *Bulletin*, 1957, v. 54, 1002.]

Maaløe, O. La estandarización de antivenenos de serpiente. [**On the Standardization of Snake Antivenenes**] *Bol. Oficina Sanitaria Panamericana.* 1957, July, v. 43, No. 1, 77–91, 2 figs. [34 refs.]

"The English summary appended to the paper is as follows:—

"This paper has three main objectives. First, it presents the evidence, old and more recent, on which it may be decided whether to embark on a large scale programme with the aim of creating international standards for the determination of the potency of *antivenins*. Second, it discusses some practical and theoretical aspects of the standardization

problem which, in the author's opinion, indicate that it may be more rational to establish standard venins than standard antivenins. This part of the paper includes a detailed discussion of assay procedures. Finally, a number of venoms which seem to be likely objectives for standardization are discussed individually, and in relation to the Regions in which they might be most intensively studied."

I. Abdullah, S. **Calcium Chloride for Scorpion Bites.** [Correspondence.] *Brit. Med. J.* 1957, June 8, 1366.

II. Holmes, M. McA. **Scorpion Bites.** [Correspondence.] *Brit. Med. J.* 1957, Aug. 10, 353.

I. This correspondent, from Calcutta, having found standard treatments for scorpion bite unsatisfactory, treated 4 patients with an intravenous injection of 5 ml. of 10% calcium chloride solution and obtained a rapid and complete relief. The pain disappeared by the time the feeling of warmth due to the injection had subsided and the patients were able to go about their business within a few hours. Observations on this purely empirical treatment are invited.

II. The second correspondent, in Nigeria, refers to this letter and states that he obtained instantaneous relief from the effects of scorpion bite in his patients by means of the injection into the bites of 1 grain (65 mgm.) of emetine hydrochloride in 1 ml.: sometimes 0.5 ml. or less was sufficient. In over 30 such treatments the results were dramatic, and this treatment has sometimes resulted in permanent relief in patients who had still been in severe pain 2 to 3 hours after having received a local analgesic.

This treatment is also empirical and no explanation is offered.

H. J. O'D. Burke-Gaffney

Maretić, Z. Erfahrungen mit Stichen von Giftfischen. [**Observations on the Stings of Poisonous Fish**] [Miscellanea]. *Acta Tropica.* Basle. 1957, v. 14, No. 2, 157–61, 2 figs.

Scorpaena scropha lives on the sea bed and it is so adapted that it can change its colour and pattern in a chameleon-like manner.

The author observed the effect of a *Scorpaena* sting on a fisherman who had a wound on the middle finger of the right hand. The extremity became red and swollen with pains and paraesthesia of the forearm. An intravenous injection of 10 cc. of 20% calcium gluconate gave great relief. Similar symptoms were observed in 2 other patients.

Trachinus draco is more poisonous and is known on the Adriatic Coast as the sea spider. The fishermen cut out the poisonous barbs directly. These are found in the black dorsal fin and the covering of the gills. Very often the sting takes place when the fish is trodden upon in shallow water. The pain and swelling are considerable and appear to

yield to calcium gluconate. 2 cases of *Trachinus* poisoning have been observed.

That the *Scorpaena* poison exerts a purely local effect could be ascertained from experiments on 12 guineapigs which were either stung or injected with an extract from the barb.

Trachinus venom, on the other hand, has a general as well as a local effect. Guineapigs injected with poison from the fins exhibited tachycardia. In others there was a rapid rise of eosinophils from 118 to 1,186 per cmm. within 4 hours.

The poison of both these fishes contains hyaluronidase.

Philip Manson-Bahr

Mazaud, R., Labegorre, J. & Moissinac, J. Etapes bioclinques d'un cas mortel d'envenimation par piqûres d'abeilles. [**Clinical Stages of a Fatal Case of Bee Sting**] *Bull. Méd. de l'Afrique Occidentale Française*. (n.s.) 1957, v. 2, No. 1, 83–6.

TOXOPLASMOSIS

Giorn. di Malattie Infettive e Parassit. 1957, Jan., v. 9, No. 1, 1–51, numerous figs. [Numerous refs.] Fascicolo dedicato a ricerche sulla toxoplasmosi. [**Issue devoted to Researches on Toxoplasmosis**]

The present issue of this journal, which is devoted entirely to toxoplasmosis, comprises the following 7 papers recording the results of investigations carried out in the medical and veterinary departments of the University of Messina, under the direction of Prof. A. Bonaduce.

A. Bonaduce and F. Andrini (p. 1) deal with the effect upon experimental toxoplasmosis in mice of sulphonamides and sulphones; they found that some of these compounds had no action whatever, while others had a slight effect, manifested by longer survival of the infected animals.

F. Andrini and V. Orlandella (p. 12) describe the effect of antibiotics on experimentally infected mice: penicillin, streptomycin, bacitracin, erythromycin, neomycin, chloramphenicol and fumagillin proved to be ineffective, while chlortetracycline, oxytetracycline and tetracycline only retarded the death of the animals. Similar tests are described by V. Orlandella and F. Andrini (p. 19), who found that none of the following drugs had any effect on infected mice: Acapron, antimosan, Atoxyl, emetine, propylene glycol, glucantime, Naganol [suramin] + antimosan, nivaquine, tartar emetic, trypan blue.

A. Ferrara, F. Andrini, V. Orlandella and S. Santoro (p. 22) give an account of changes in the central nervous system occurring in experimentally infected mice, rabbits and guineapigs, and discuss their

pathogenesis. A. Bonaduce and F. Andrini (p. 35) carried out *in vitro* tests of various compounds on *Toxoplasma* in diluted peritoneal exudate of infected mice, with the following results: (a) 5% amuchina, 1:2 furazine, 1:2 hydrogen peroxide, 5% merfen, 0·5% formalin, 1:2 Lugol's iodine, 0·2% formic acid, 1:2,000–1:20,000 cetyl-trimethyl-ammonium-bromide, Zephyran, dodecyl-methyl-phenyl-trimethyl-ammonium hydroxy-methylsulphate, aseptan and merthiolate, killed the parasites within 5 minutes; (b) 0·2% acetic, citric, carbolic, phosphoric and lactic acids killed them in 15 minutes; (c) 0·2% boric and hydrofluosilicic acids, 0·1% sodium hydrate, 0·5% ferrous sulphate did not kill them in 15 minutes; (d) Achromycin [tetracycline] had no effect at 0·1% for 30–60 minutes, nor at 0·25% or 0·5% for 30 minutes, but killed the parasites at the last two concentrations in 60 minutes; (e) 0·1% and 0·25% erythromycin and tetraseptale were ineffective after 30 and 60 minutes, but at 0·5% had a lethal effect in 60 minutes; and (f) 0·1%–0·5% fumagillin had no effect upon the toxoplasms up to 60 minutes. C. Alosi and F. Andrini (p. 38) studied changes in the protein fractions of the serum of infected guineapigs by microelectrophoresis, and found that there was a disturbance in the percentage of albumin and an increase of gamma globulins. G. Quattrocchi, V. Orlandella and F. Andrini (p. 43) describe the cardiac symptoms in infected guineapigs, as revealed by electrocardiograms. *C. A. Hoare*

Hański, W. & Fermus, R. Badania nad częstością występowania toksoplazmozy na terenie Radomia i okolicy na podstawie materiału sekcyjnego. Doniesienie I. [**Investigations on the Frequency of Incidence of Toxoplasmosis in the Town and District of Radom on the Basis of Autopsy Material**] *Przegląd Epidemiol.* Warsaw. 1957, v. 11, No. 2, 131–7, 1 fig.

The English summary appended to the paper is as follows:—

"Out of over 600 post-mortems performed in the Anatomopathological Laboratory of the Municipal Hospital in Radom in the period from Jan. 1st, 1955, to June 30th, 1956, congenital toxoplasmosis in children was ascertained in 14 cases. An analysis of the material, serologically confirmed in eight cases, permits the following conclusions to be drawn.

"Cases of congenital toxoplasmosis appear in both the town and district of Radom, and their number is probably in simple numerical relation to the density of population. Infection with toxoplasmosis is in a considerable percentage of cases the cause of premature confinement; this affects 12 premature babies in the material under discussion. The morphological changes are in the majority of cases very discrete, and sometimes only detectable under the microscope, which justifies the introduction of obligatory microscopic examination of the brain, especially in cases of medicolegal post-mortems which are not thanatologically clear."

Hiraoka, T. **A Study of Toxoplasmosis. Report 1. The First Five Cases of Human Toxoplasmosis in Western Japan.** *Kyushu J. Med. Sci.* Fukuoka. 1957, Apr., v. 8, No. 2, 41–56, 8 figs, on pl. [44 refs.]

"1. In Kyushu *Toxoplasma gondii* was first isolated from five infant patients with suspected cerebrotumor, epilepsy, harelip and cleft palate, and microcephalia, and each case was subjected to detailed examination.

"2. The protozoans isolated were semilunar or arc-shaped and 7 to 3μ by 3·5 to 1·5μ in size, becoming purple-colored in the protoplasm and a trifle reddish-purple colored in the nucleus when stained. From the results of morphological comparison and cross immunization test, they were all identical with the American RH strain.

"3. Now that the study of *Toxoplasma* and toxoplasmosis is still in its infancy in Japan, the first isolation of protozoans of the genus from human beings in western Japan is here reported for the benefit of those interested in this branch of medical research."

Schmidtke, Liselotte. Nachweis von *Toxoplasma* im Fruchtwasser. Vorläufige wissenschaftliche Mitteilung. [**The Demonstration of *Toxoplasma gondii* in Amniotic Fluid: Preliminary Report**] *Deut. med. Woch.* 1957, Aug. 16, v. 82, No. 33, 1342.

2 cases are shortly described in this communication; in the first toxoplasms were recovered from the cerebrospinal fluid of an infant with hydrocephalus, while in the second they were found in the amniotic fluid where the baby was born with anencephaly. In neither case was the dye test positive and emphasis is laid on the value of mouse inoculation of cerebrospinal or amniotic fluid where the clinical evidence suggests a diagnosis of toxoplasmosis. *I. A. B. Cathie*

Hooper, Anne D. **Acquired Toxoplasmosis. Report of a Case with Autopsy Findings, including a Review of Previously Reported Cases.** *Arch. Pathology.* 1957, July, v. 64, No. 1, 1–9, 8 figs. [34 refs.]

"A 43-year-old white man with a long history of panhypopituitarism due to a chromophobe adenoma of the pituitary gland died of toxoplasmosis and portal cirrhosis of the liver. At necropsy pseudocysts of Toxoplasma gondii and chronic inflammatory reactions were found distributed throughout the heart, lungs, thyroid, bone marrow, retroperitoneal fat, skeletal muscle, smooth muscle of the esophagus, brain, and spinal cord. The pituitary showed fibrosis, bone formation, and recent hemorrhage. A few groups of chromophobe adenoma cells were present.

"The free form of T. gondii is found in body fluid smears while the proliferative form and the pseudocyst are found in fixed tissue. No free forms were seen in the bone marrow smears in this case, but

proliferative forms and pseudocysts were seen in histologic preparations. A pseudocyst was found in the bone marrow smears.

"The complement-fixation reaction and the Sabin-Feldman dye test help establish the diagnosis. The dye test cross reacts with Sarcocystis, Trichomonas vaginalis, and Trypanosoma cruzi.

"In a review of previously autopsied cases it was noted that the lesions and organisms are most frequently found in the heart and next most frequently found in the brain. They are also found fairly often in lymph nodes, lungs, skin, and skeletal muscle. Fatal toxoplasmosis is often associated with severe chronic liver disease."

Pillat, A. & Thalhammer, O. Herdförmige Iridocyclitis als (einzige) Manifestation einer erworbenen Toxoplasmose, ätiologisch gesichert durch Titerkurve und Tierversuch. Zugleich ein Beitrag zur Diagnose des Alters einer Toxoplasmoseinfektion durch das "Diskrepanzauswertungsverfahren" und zur Art der in Sabin- Feldmann- und Komplementbindungsreaktion reagierenden Antikörper. [**Focal Iridocyclitis as the Sole Manifestation of Acquired Toxoplasmosis, aetiologically proved by the Titre Curve and Animal Inoculation**] *v. Graefes Arch. f. Ophthalm.* 1957, v. 158, No. 5, 403–15, 2 figs. [Numerous refs.]

Whereas it has long been known that congenital toxoplasmosis can lead to chorioretinitis, optic neuritis and iridocyclitis, it has only recently been shown that acquired toxoplasmosis can produce chorioretinitis [Wising; Jacobs *et al.*; Wilder; this *Bulletin*, 1952, v. 49, 805; 1956, v. 53, 1049; 1953, v. 50, 65] and optic neuritis [Prior *et al.*, *ibid.*, 1954, v. 51, 105]. For the first time it is now proved that acquired toxoplasmosis can cause iridocyclitis.

The case reported is of a boy aged 11 years who developed iritis of the right eye and cyclitis of the left. In spite of active treatment over a period of 8 months his condition deteriorated until the right eye became useless and was enucleated. From the enucleated eye toxoplasms were isolated by mouse inoculation.

A study of antibody levels during the course of illness showed titres that rose and later fell. An interesting observation was that the toxoplasmin skin test was at first negative and three weeks later became positive.

Date	Dye Test	Complement-Fixation Test	Skin Test
23. 3.55.	1:64	1:64	
7. 4.55.	1:4096		Negative.
28. 4.55.	1:16384	>1:128	Positive.
10. 6.55.	1:16384		
29.12.55.	1:256		

The authors suggest that the absence of a skin test reaction in the presence of serum antibodies indicates recent infection.

Ophthalmologists might profitably read in the original the detailed description of the eye condition. *C. P. Beattie*

Petrovický, O. Generalisovaná cysticerkóza a současná infekce toxoplasmatická. [**Generalized Cysticercosis accompanied by *Toxoplasma* Infection**] *Československ. Parasit.* Prague. 1956, v. 3, 77–80. [27 refs.] English summary (3 lines).

The English summary appended to the paper is as follows:—

"A case of cysticercosis (muscular and cerebral form) in a woman of 65 years is described. This malady had started at the age of 31 years. In the last two years the woman shows both clinical and serological signs of acquired toxoplasmosis (pseudoneurasthenic type)."

Varela, G., Vázquez, A. & Torroella, J. Probable existencia de la dietilamida del ácido D-lisérgico en la infección por *Toxoplasma gondii*. [**Probable Presence of d-Lysergic Acid Diethylamide in *Toxoplasma* Infections**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1956, Dec., v. 16, No. 4, 29–32, 1 fig. [13 refs.]

The English summary appended to the paper is as follows:—

"Brain extracts as well as extracts obtained from the peritoneal exudate of white mice with severe experimental toxoplasmosis, have a substance, probably d-lysergic acid diethylamide. The substance was tested by the action produced by it on the chromatophores of the female fish *Lebistes reticulatus*. (Cerletti and Berde test, 1955.)"

DERMATOLOGY AND FUNGUS DISEASES

Huppert, M. **A Technique for the Safe Handling of *Coccidioides immitis* Cultures.** *J. Lab. & Clin. Med.* 1957, July, v. 50, No. 1, 158–64, 1 fig. [14 refs.]

In laboratories where a "sealed transfer chamber" is not available for handling cultures of *Coccidioides immitis*, the risk of infection through inhalation of the spores of this fungus can be avoided by using a technique devised by the author. This consists of a 60 ml. screw-capped culture bottle, the cap of which has a circular opening closed by a rubber diaphragm. The culture medium, forming a slant or plate in the

bottle, is inoculated with the morbid material under examination and the bottle is then sealed with its screw cap. After incubation, when the fungus has grown, the rubber diaphragm was painted with tincture of iodine, and a hollow needle, loosely wrapped in cotton wool soaked in 70% alcohol, was used to pierce it. With an attached syringe 5 ml. of sterile isotonic saline was injected into the bottle and, after vigorous shaking, a quantity of the emulsified culture was withdrawn, care being taken to keep the needle point covered with the alcohol-soaked cotton wool to prevent the accidental discharge of any infective matter into the air. The contents of the syringe were injected into mice in 0·5 ml. doses, for the identification of the fungus in its parasitic form, and the residue was used to make a subculture by piercing the diaphragm on a fresh culture bottle. The original culture was then sterilized by injecting 0·5 ml. of 8% formaldehyde through the diaphragm, and, after 24 hours' incubation at 37°C. it was safe for direct microscopical examination.

It was found advantageous to pierce the diaphragm with the sterilized needle, its base plugged with cotton wool, at the time of sowing the culture and to leave it *in situ*. This enabled some necessary aeration of the growing culture and was more convenient for the subsequent operation of the technique. *J. T. Duncan*

TROPICAL OPHTHALMOLOGY

McGuire, C. D. & Durant, R. C. **The Role of Flies in the Transmission of Eye Disease in Egypt.** *Amer. J. Trop. Med. & Hyg.* 1957, May, v. 6, No. 3, 569–75.

The authors, in Egypt, set out to determine the number and types of bacteria associated with the 2 common species of house-fly (*Musca domestica vicina* and *M. sorbens*) captured on the faces of children and to correlate the findings with the aetiology of eye infection.

The surface and internal bacterial flora were determined in 80 pools each of the 2 species, by plating methods which are described in detail. The eyes of 75 children under the age of 3 and free from signs of eye disease in the 2 villages in which the flies were collected were swabbed each week during August and September. The eyes of children with ophthalmia were swabbed daily. The swabs were also plated. The results are shown in tables. In both species of fly there were about 20 times as many internal as external bacteria. The total number of bacteria associated with *M.d. vicina* was about twice that found in *M. sorbens*.

The bacterial isolations are listed and shown by months. Enteric bacteria were found in every pool of flies, and organisms associated with respiratory infections, conjunctivitis and pyogenic infections were often isolated. Although total bacterial counts did not show seasonal variation, micrococci showed some seasonal preference: beta-haemolytic staphylococci and streptococci were isolated most frequently in August while non-haemolytic and alpha-haemolytic staphylococci were found mostly in April to June.

Bacterial types similar to those isolated from flies were obtained from healthy and diseased eyes of Egyptian children. The commonest isolation was of haemolytic micrococci, and it is suggested that most of the bacterial ophthalmias associated with infestation of the faces and eyes of Egyptian children are caused by streptococci and staphylococci: possibly in some cases enteric bacteria play a part.

[See also Bakry, this *Bulletin*, 1956, v. 53, 657.]

H. J. O'D. Burke-Gaffney

Nakamura, Y. De l'anatomie pathologique du trachome au Japon. [**Pathological Anatomy of Trachoma in Japan**] *Rev. Internat. du Trachome.* 1957, v. 34, No. 2, 93–189, 85 figs. & 1 folding pl.

Kony, Maria. Résultats de trois années de traitement massif du trachome de la population indigène du Maroc dans le cadre de l'oeuvre de secours aux enfants (O.S.E.-Maroc). [**Results of 3 Years of Mass Treatment of Trachoma among Africans in Morocco**] *Rev. Internat. du Trachome.* 1957, v. 34, No. 2, 213–29, 5 figs.

The English summary appended to the paper is as follows:—

"Remote results of trachoma treatment after 3 years of survey, in 28,000 natives including 7,000 school-children.

"Treatment by aureomycin ointment at 1% brought at home 3 times a day.

"Results: 55% healed, 30% improved. Rate reduced for school-children from 50 to 23·4% in 2 years."

Kobayashi, S., Tashima, H., Tanaka, K. & Uyeno, H. **Results of Mass Treament with Achromycin Oil Suspension against Trachoma in Pupils.** *Acta Med. et Biologica.* Niigata. 1957, Mar., v. 4, No. 4, 311–16, 3 figs.

The authors treated a series of 77 cases of chronic trachoma with 1% Achromycin [tetracycline] oil suspension 3 times daily, the cure rate at 10 weeks being 89·7%. This is a very satisfactory result, being a slight

improvement on the use of 1% Achromycin vaseline ointment, in which the cure rate, as previously reported, was 86·9% [this *Bulletin*, 1957, v. 54, 877].

This difference between oil suspension and ointment is not large; furthermore the oil suspension was used 3 times daily, and the vaseline only once a day. The use of ointment must therefore be more efficient than the use of oil suspension, but the oil suspension has the advantages of being easier to use and does not result in temporary blurring of vision. Also the oil suspension is not liable to exhibit side-effects and does not lose potency in a short period of time as is the case with the aqueous solution.

The authors therefore feel that the oil suspension is destined for wider use in the future. *D. P. Choyce*

HEAT STROKE AND ALLIED CONDITIONS

Glaser, E. M. & Newling, P. S. B. **The Control of Body Temperature in Thermal Balance.** *J. Physiology.* 1957, June 18, v. 137, No. 1, 1–11, 1 fig. [29 refs.]

Over a six months' period in Singapore 3 Chinese males, wearing shorts, were exposed in random order to 4 environments, *viz.* 16·5, 22·2, 26·8 and 35·2°C. corrected effective temperature (CET) in a room. Mouth and skin temperatures (17 body areas), blood pressure and pulse were measured at 10-minute intervals. Thermal adjustment was presumed when 2 successive 10-minute readings lay within previously specified limits of each other.

Having become thermally adjusted to the Singapore room temperature (CET 26·8°C.) they were cooled by wet towels, or heated by heat cradle for exactly 5 minutes. Thereafter the 10-minute observations were continued till thermal balance was again achieved.

Mouth and skin temperatures were found to be positively and significantly ($P < 0{\cdot}01$) correlated with environmental temperature.

In any one environment the levels at which the temperatures of mouth and extremities achieved balance were higher after 5 minute periods of warming than after the same periods of cooling.

The pulse was higher ($0{\cdot}1 > P > 0{\cdot}05$) and diastolic blood pressure lower ($0{\cdot}05 > P > 0{\cdot}01$) in all environments after previous warming than after previous cooling.

These results show that thermal balance may be maintained over a wide range of body temperature (of about 1°C.). Once attained, thermal equilibrium can be upset by a comparatively small change in skin temperature. *M. L. Thomson*

Stallones, R. A., Gauld, R. L., Dodge, H. J. & Lammers, T. F. M. **An Epidemiological Study of Heat Injury in Army Recruits.** *Arch. Indust. Health.* Chicago. 1957, June, v. 15, No. 6, 455–65, 5 figs.

A previous survey of 9 U.S. Army posts had indicated that the highest incidence of heat injury occurred in Camp Chaffee, Arkansas, which had 38 severe cases, with 2 deaths in the 4 years preceding 1955 when the present study was made. In this unusually cool summer there were 138 attacks of heat illness in 132 persons.

At admission, 60% had less than 99° F., and 87% less than 100° F. body temperature. One-quarter had heart rates exceeding 100 min. Specific gravity in 77% of urines was above 1020. Other symptoms reported were dizziness and faintness (90%), nausea (50%), headache (60%), decrease in sweating prior to onset (33%) and unconsciousness (40%).

Factors affecting the onset were (1) physical activity, (2) lack of acclimatization to heat, (3) extremes of age (those less than 19 and above 25 years were more susceptible), (4) obesity.

From hourly readings at the camp the effective and corrected effective temperature, globe-wet-bulb effective temperature and Belding's Heat Stress Index were calculated. The daily maximum dry-bulb temperature was a better index of the occurrence of heat injury than the more complex indices.

Suggestions were made for prevention which involved mainly the avoidance by company officers of duties involving exertion during hot spells. *M. L. Thomson*

MISCELLANEOUS DISEASES

Thijs, A. Le rhinosclérome au Congo belge et au Ruanda-Urundi. [**Rhinoscleroma in the Belgian Congo and in Ruanda-Urundi**] *Ann. Soc. Belge de Méd. Trop.* 1956, Oct. 31, v. 36, No. 5 *bis*, 781–91, 5 figs. on 2 pls. [13 refs.]

After a historical introduction this paper concerns itself with a description of 8 cases of rhinoscleroma from Ruanda-Urundi and 3 from N. Kivu, areas which resemble each other geographically and economically, being mountainous regions (1,700 to 2,200 metres above sea level). In the course of examination of some 50 biopsies of nasal tumours from other districts in the Belgian Congo this disease has never been encountered.

Histological examination was decisive, the only difference between individual cases being in the number of Mickulicz and colloidal cells and

by the extent of fibrosis. In 3 the author was able to observe the process of degeneration of the cytoplasm of the Mickulicz cells and the formation of hyaline eosinophilic intracytoplasmic bodies. The author thinks that Russell bodies which are so typical of rhinoscleroma are really degenerate plasma cells.

Excision of the vegetations by electrocoagulation induces cicatrization and has a favourable effect on the disease.

The author thinks that, if Frisch's bacillus (*Klebsiella rhinoscleromatis*) is the real cause of rhinoscleroma, then the tetracyclines should have a beneficial effect. *Philip Manson-Bahr*

Gillman, T., Lamont, N. McE., Hathorn, M. & Canham, P. A. S. **Haemochromatosis, African Nutritional Siderosis, and Experimental Siderosis in Animals.** *Lancet*. 1957, July 27, 173–5. 2 figs. [19 refs.]

Siderosis is a very important cause of morbidity among the Bantu population of Durban, where 400–500 patients showing severe effects of this disease are admitted to hospital annually. Out of 100 male patients suspected of suffering from liver disease, abnormal haemosiderin deposits were demonstrated by liver biopsy in 88. Though portal fibrosis can occur without siderosis, in 24 patients who showed gross deposits of haemosiderin in the portal tracts, 22 had developed severe portal fibrosis and in 2 the lesion was less marked. The correlation between portal fibrosis and portal siderosis was statistically valid, while the incidence of portal cirrhosis was significantly higher in those with advanced siderosis than in those whose livers were not siderotic. Gross degrees of hepatic siderosis were significantly correlated also with testicular atrophy. The authors do not maintain that this relationship of iron deposition to the development of fibrosis is necessarily one of direct causation, but suggest that a multiplicity of factors, prominent among which is malnutrition, lead to an abnormal reactivity of the stromal tissues to macromolecules such as the iron-protein complex. In experimental animals, iron overload of the liver will only lead to cirrhosis if the diet is deficient in protein.

Though on histological grounds African hepatic siderosis cannot be distinguished from the idiopathic haemochromatosis of Europe, biochemically the two conditions appear distinct. In African siderosis uncomplicated by hepatic failure or infection, although the serum iron concentration is moderately increased above the normal, the saturation index is within normal limits because the total iron-binding capacity of the serum is increased. This is probably due to an increase in the iron-carrying beta globulin, which shares in the general elevation of the serum globulins found in Africans living in Africa. These findings contrast vividly with results obtained in European haemochromatosis, in which

the serum iron concentration and the saturation index are markedly raised above the normal range. Typical figures quoted are:—

	Normal	European Haemochromatosis	African Siderosis
Serum iron concentration μgm. per 100 ml.	106	225	149
Iron-binding capacity μgm. per 100 ml.	311	241	410
Saturation %	34	93	36

A comparison of the biochemical changes in the serum with the histopathological changes in the liver suggests that some metabolic disturbance, whose nature is not understood, is manifest by an increase in the serum iron concentration and in the total iron-binding capacity early in the disease.

[See also this *Bulletin*, 1957, v. 54, 1132.]

J. H. Walters

Kirk, R. **The Pathogenesis of some Tropical Splenomegalies.** *Ann. Trop. Med. & Parasit.* 1957, June, v. 51, No. 2, 225–34. [28 refs.]

In this review the author discusses the pathogenesis of splenomegaly in kala azar and in 3 other clinical conditions, "Egyptian splenomegaly," "Bengal splenomegaly" and the "cryptogenic splenomegaly of the Far East."

In kala azar the defensive proliferation of the reticulo-endothelial tissue within the spleen in response to the entry into the body of a parasite is rendered relatively invalid through the ability of the leishmania to invade and to multiply within the reticulo-endothelial cells themselves. The rupture of such parasitized cells with reinvasion of others by the liberated leishmaniae initiates a vicious circle which determines an excessive production of reticulo-endothelial tissue. The smooth muscle bundles of the spleen cannot undergo a hypertrophy proportionate to that of the reticulo-endothelial element, the bulk of which impairs the rhythmical muscular contractions of the normal spleen and leads to marked stasis of blood within the sinusoids. A secondary hypersplenism thus develops, which is recognizable histologically by the presence of large numbers of reticulo-endothelial macrophages in which active phagocytosis of all the cellular components of the blood is evident. In the chronic, virtually afebrile type of kala azar, in which the spleen is much enlarged and very hard, this secondary pan-hypersplenism dominates the pathological scene; in such cases leishmaniae are rare, specific therapy is often ineffective and splenectomy may be indicated, though drug treatment should be continued post-operatively.

The aetiological role of schistosomiasis—mainly the *S. mansoni* type—in the pathogenesis of Egyptian splenomegaly has never been proved; its main basis lies on epidemiological evidence of the association in Egypt of this type of splenomegaly with the geographical distribution of schistosomiasis. The same association has more recently been described

in East Africa, the Belgian Congo, Rhodesia and South Africa, while a similar clinical condition has been recognized in the Far East (Katayama disease) to coincide with the distribution of *S. japonicum*. Nevertheless, in a considerable proportion of cases typical of the syndrome, no evidence of a schistosomal infection can be found even at autopsy, while in those associated with schistosomiasis the spleen is always free from ova and recent biopsy studies of the spleen carried out in Egypt [this *Bulletin*, 1957, v. 54, 1202] have revealed only non-specific congestive changes.

Portal hypertension can rarely be attributed to schistosomiasis, which causes only the relatively benign type of fibrosis called Symmers's pipe-stem cirrhosis; it is possible that protein malnutrition associated with schistosomal damage may lead to more extensive hepatic fibrosis, with eventual portal obstruction.

The author himself carried out skin sensitivity tests to schistosomal antigen in 25 patients with obscure splenomegaly in the Sudan, with positive results only in 16; he concludes that a number of Sudanese cases of obscure hepato-splenomegaly are not due to schistosomiasis, though others are in some way associated with this form of parasitization.

The syndrome of "Bengal splenomegaly" comprises splenomegaly and haemolytic anaemia. Most examples of this syndrome come from malarious areas, though they show no parasitaemia at this stage of the disease. Kala azar can be excluded as an aetiological agent. The existence of hypersplenism is demonstrated in the histological changes in the spleen, and is confirmed by evidence of hypersequestration of blood cells in that organ, by bone-marrow hyperplasia and by the beneficial effects of splenectomy. It is concluded that Bengal splenomegaly represents a type of hyperplenism secondary to a chronic malarial infection which has been suppressed by the development of a specific immunity.

The "cryptogenetic splenomegaly of the Far East" is an even more obscure and ill-defined clinical condition, of which the salient features are gross splenomegaly, intermittent low fever and a gradual deterioration in health. It is often associated with fibrosis of the liver of variable degree up to frank cirrhosis; there is some evidence from Hong Kong that splenic changes precede those in the liver [*ibid.*, 229]. The author considers that the "cryptogenetic splenomegaly" of North and South China and Formosa and the "tropical febrile splenomegaly" of the Philippines and of Ceylon exemplify the same condition which he has studied in Malaya. A degree of hypersplenism causing pancytopenia and increased haemolysis is usual, while antibody production in response to a stimulus such as the injection of TAB antigen is impaired. Most specific infections and reticuloses causing chronic splenomegaly can be excluded such as leishmaniasis, brucellosis and the leukaemias, but since the descriptions of this syndrome all emanate from areas in which malaria is or has been endemic, a suppressed plasmodical infection cannot be ruled out of the list of aetiological possibilities.

[This important review by a very experienced tropical pathologist underlines the need for further research into this obscure group of conditions, which should include an enquiry into the problem why, in hyperendemic zones, a marked degree of malarial splenomegaly without hypersplenism, which is universal in childhood, should persist into adult life in a small proportion only of the population.]

[See also Chaudhuri, this *Bulletin*, 1957, v. 54, 1130.]

J. H. Walters

Thijs, A. L'angiosarcomatose de Kaposi au Congo belge et au Ruanda-Urundi. [**Kaposis Angiosarcoma in the Belgian Congo and Ruanda-Urundi**] *Ann. Soc. Belge de Méd. Trop.* 1957, Apr. 30, v. 37, No. 2, 295–307, 16 figs. on 4 pls. [31 refs.]

PARASITOLOGY: GENERAL

Cotrim, J. X. & Ramalho, A. C. R. Nova técnica de coloração de protozoários pelos derivados do Romanovsky. [**New Modification of Romanowsky's Method for Staining Protozoa**] *Folia Clin. et Biol.* S. Paulo. 1955, Apr.–June, v. 23, Nos. 4/6, 161–6, 4 figs. on 2 pls.

It is well known that various modifications of the Romanowsky method, which are suitable for staining blood and tissue forms of blood protozoa, produce unsatisfactory results when used for staining the cultural and insect stages of these parasites.

The authors describe a new technique for staining these forms satisfactorily. The procedure is as follows: smears are first covered for 1½–2 minutes with a mixture composed of 1 cc. May-Grünwald stain, 1 cc. Giemsa stain and 2 cc. methyl alcohol, after which an equal volume of distilled water is added to the preparation and staining is continued for 3–5 minutes, and finally the slide is washed in running water and dried.

For the staining of cultures of leishmanias and trypanosomes, the cultures are centrifuged, decanted, and repeatedly centrifuged in saline, after which the sediment with the flagellates is mixed with an equal volume of inactivated human serum, spread on a slide and stained as described above. In the case of Triatomid bugs infected with *Trypanosoma cruzi*, as well as of intestinal flagellates, the faeces mixed with the serum are smeared on a slide and stained.

The appearance of the protozoa stained by this method is shown in the accompanying photomicrographs. *C. A. Hoare*

Jírovec, O. *Sergentella spiroides*, parasite nouveau de l'homme. [*Sergentella spiroides*, **a New Parasite of Man**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Jan., v. 8, No. 1, 203–5, 1 fig.

An account of 17 cases. See this *Bulletin*, 1953, v. 50, 856, (982).

United States Dept. of Agriculture. **Parasites and Parasitic Diseases of Sheep** [Lucker, J. T. & Foster, A. O.]. 50 pp., 29 figs. Farmers' Bulletin No. 1330. Revised May 1957. Wash. 25: U.S. Govt. Printing Office. [$0.20.]

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Reid, E. T. M. **The Diagnostic Value of the Foretarsus in Male Anopheline Mosquitoes (Dipt., Culicidae).** Reprinted from *Entomologist's Monthly Magazine*. 1957, Mar. 4, v. 93, 7–10, 1 fig.

Phipps, J. **Observations on the Behaviour of Culicine Mosquitos in African Huts.** *Bull. Entom. Res.* 1957, June, v. 48, Pt. 2, 275–88. [18 refs.]

"Observations on the behaviour of *Culex pipiens fatigans* Wied. were made in 24 huts built and occupied by Africans on a sisal estate near Tanga, Tanganyika Territory. Catches were made in four huts each day, an exit trap being fixed on the window from 2 p.m. to 6 p.m. (evening trap) and replaced by another from 6 p.m. to 8 a.m. next day (morning trap), when a spray catch was made of the mosquitos still in the hut. Each hut was used only once a week, for 31 weeks, from December 1952 to July 1953. The females caught were sorted according to the stage of the gonotrophic cycle, as judged by external examination. The stages used were: I, no blood, no visible ovaries; II, stomach full of blood, ovaries small; V, little or no blood, ovaries fully developed; III and IV, intermediate between II and V.

"An analysis of variance was performed on the results. Catches of both sexes showed a significant variation with time, which was not, however, correlated with rainfall. Significantly different numbers were taken in the traps and in the huts. Females were significantly most numerous in the hut catch, and males in the morning trap, the former result suggesting that most females spend more than one day in a hut.

There were significant differences between the numbers of females in the different stages of the gonotrophic cycle, stages I and II together accounting for 80 per cent. of all females caught. The high proportion of stage I is attributed to delay between emergence and feeding, and of stage II to the taking of more than one meal during the gonotrophic cycle, later meals obscuring the state of ovarian development. There were significant differences between huts as regards the numbers of females caught, but not as regards males, and it is concluded that this is due to variations in the attractiveness of the inhabitants of the huts.

"Females in stage I were most numerous in the morning trap, those in stages II–IV were taken only rarely in traps, but there was no significant difference between numbers of stage V caught in huts and in the two window traps. These results are attributed to restlessness in both hungry and gravid females, and sluggishness in fed ones. All stages except III were significantly more numerous in some weeks than in others and this might be due to variations in either rate of reproduction, or rate of loss of mosquitos from huts. There were significant variations in behaviour in different weeks. For females, this is attributed to changes in the proportions of the stages with time and the dependence of behaviour on stage. For males, there is some evidence of a relation between behaviour and humidity outside the hut. For females, the distribution of stages between different places of capture changes with time, stages II and III being most consistently associated with hut catches, while the most variable behaviour is shown by stage V.

"The necessity for behaviour studies on mosquitos in the field is pointed out, especially in relation to field trials of residual insecticides."

Stephen, A. **The Control of Mosquito Development in a Large Swamp Area by Aerial Spraying.** *Pub. Health*. Johannesburg. 1957, June, v. 20, No. 6, 9–10, 14, 17, 2 figs.

An almost inaccessible swamp 94·7 acres in extent in the Durban area, South Africa, is a source of a considerable number of mosquitoes, mainly *Culex fatigans*, constituting a nuisance to an adjacent housing area with 30,000 population. Drainage is to be undertaken but as a palliative measure the aerial application of dieldrin was tried. An emulsion of dieldrin was sprayed from a Piper Cub aircraft with a 60-gallon tank from which insecticide is pumped through nozzles in two lateral booms. The intended application rate was half a gallon of an 18·5% emulsion per acre, this emulsion being diluted to give an actual application rate of 12 gallons per acre.

The work was successful, the nuisance came to an end and it seemed that the water retained larvicidal properties because samples removed and seeded with larvae from elsewhere appeared lethal for as much as 45 days after the spraying. [No controls on these last tests are described.] *G. Macdonald*

Gentry, J. W. & Hubert, A. A. **Resistance of *Culex quinquefasciatus* to Chlorinated Hydrocarbons on Okinawa.** *Mosquito News.* 1957, June, v. 17, No. 2, 92–3.

"Inability to control *Culex quinquefasciatus* [*fatigans*] larvae on Okinawa with DDT and chlordane prompted initiation of a series of tests with these insecticides as well as dieldrin, lindane and malathion. Results of these tests indicate that this mosquito is extremely resistant to the chlorinated hydrocarbon insecticides and that it has little or no resistance to malathion."

Omardeen, T. A. **The Behaviour of Larvae and Pupae of *Aëdes aegypti* (L.) in Light and Temperature Gradients.** *Bull. Entom. Res.* 1957, June, v. 48, Pt. 2, 349–57, 9 figs.

"Experiments with second-, third- and fourth-instar larvae of *Aëdes aegypti* (L.), as well as pupae, were carried out to determine their behaviour in temperature and light gradients in an experimental trough.

"When second-instar larvae are subjected to a temperature gradient from 42°C. at one end of the trough to 8°C. at the other, the majority of larvae aggregate over the range of temperature 23–32°C. Third- and fourth-instar larvae and pupae, however, show a marked preference for the range of temperature between 28–32°C.

"When subjected to a light gradient from 1·08 log foot-lamberts to 1·25 log foot-lamberts, second- and third-instar larvae show no marked preference for any one light intensity. The majority of fourth-instar larvae, however, aggregate in the darkest region of the trough, and this negative phototactic reaction is very pronounced in the pupae. This behaviour is probably correlated with the development of sense organs as the larvae grow. In the case of light gradients, it is likely that the increasing negative phototactic reaction is due to the increasing sensitivity of the imaginal compound eye which starts developing in the early larval instars and reaches an advanced stage in the pupa."

See also p. 1310. Teesdale. **The Genus *Musa* Linn. and its Rôle in the breeding of *Aëdes* (*Stegomyia*) *simpsoni* (Theo.) on the Kenya Coast.**

Kettle, D. S. & Parish, R. H. **Field Trials of Larvicides against *Culicoides* wih a Discussion on the Relationship between Rainfall and Larval Control.** *Bull. Entom. Res.* 1957, June, v. 48, Pt. 2, 425–34, 1 fig.

"Further observations and trials were conducted with insecticides against larvae of *Culicoides impunctatus* Goetgh. on Soutra Hill,

Midlothian. The analysis of the data was complicated by a large natural reduction (76%) which occurred in the untreated plots. Nevertheless, it appears that the following dosages of insecticidal preparation were still active two years after application:— (a) 50 and 200 mg. p,p'DDT/sq. ft. applied as a dust, wettable powder or water-miscible concentrate (99% control), (b) 50 and 200 mg. γBHC/sq. ft. as a wettable powder or 200 mg. γBHC sq. ft. as a water-miscible concentrate (95% control), (c) dieldrin at 25 mg./sq. ft., which gave 97 per cent. control and (d) chlordane at 50 mg./sq. ft., which gave 84 per cent. control.

"The effect of spray volume on insecticidal effect was investigated by applying 25 mg. and 50 mg. p,p'DDT/sq. ft. in the following spray volumes: 5, 10, 15, 25, 50 and 80 gals./acre. The effect of 50 mg./sq. ft. at each volume was less marked than in the previous work, when only one concentration was used. Weather conditions in the present season were unusual, but there were indications that moderate spray volumes (15 and 25 gals./acre) give the best results at this dosage of insecticide. The combined results for 50 mg./sq. ft. at all volumes gave only 43 per cent. residual control, while those for the lower dosage showed no residual control.

"The results are discussed with reference to the effect of rainfall on residual control. It is concluded that the volume of spray applied is unimportant provided the droplets of insecticide are closely and evenly distributed on the mossy vegetation that overlies the peat. Subsequent prolonged rain, of the order of 20 inches, is required to attain the most effective distribution of the insecticide, which is at the surface of the peat, where the eggs are laid and the newly hatched larvae will come in contact with the poison." [See also this *Bulletin*, 1957, v. 54, 96.]

Saccà, G. Ricerche sulla speciazione nelle mosche domestiche.—II. Sull'evoluzione spontanea in laboratorio di *Musca domestica cuthbertsoni* Patton. [**Speciation in the House-Fly.—II. Spontaneous Evolution in the Laboratory of** *Musca domestica cuthbertsoni* **Patton**] *Rendiconti Istituto Superiore di Sanità*. Rome. 1957, v. 20, Pt. 3, 235–46, 7 figs.

The English summary appended to the paper is as follows:—

"In an effort to make a more careful study of the phenomenon already reported of loss of differential characters in laboratory breeding in *Musca domestica cuthbertsoni* Patton, the author has observed the transformation of the form *cuthbertsoni* into the form *vicina* in the course of sixteen generations. This gradual evolution was observed in all the six characters studied, four morphological and two biological. The phenomenon is attributed to selection (due to the fact that the breeding conditions are inevitably more suitable to the requirements of *vicina*)

operating on a population of *cuthbertsoni* in which a certain degree of hybridization was present. The two forms *cuthbertsoni* and *vicina* are sympatric and indigenous to North Africa; they are completely interfertile, the hybrids showing a fertility not inferior to that of the parent forms. Yet they remain distinct in the field, due to a difference in biological requirements and a certain degree of reciprocal misogamy; this, however, does not apparently prevent gene exchange between the two populations."

Saccà, G. & Rivosecchi, L. Ricerche sulla speciazione nelle mosche domestiche.—III. Diagnosi differenziale di *M. domestica curviforceps* subsp. nova. [**Speciation in the House-Fly.—III. Differential Diagnosis of** *M. domestica curviforceps* **subsp. nova**] *Rendiconti Istituto Superiore di Sanità*. Rome. 1957, v. 20. Pt. 3, 247–57, 4 figs. & 2 pls. [12 refs.]

The English summary appended to the paper is as follows:—

"The authors give the differential diagnosis of *Musca domestica curviforceps* subsp. nova, which has been encountered in material from Tanganyika and a number of other localities in the Ethiopian region. The new form is distinguished from all other *M. domestica* sub-species on the shape of the forceps and the fifth sternite, and from the sympatric *M. domestica cuthbertsoni* Patton in a large group of characters, both morphological and biological, which are at present being studied in strains bred in the laboratory. *Curviforceps* and *cuthbertsoni* can be crossed in one direction only (♂ *curviforceps* × ♀ *cuthbertsoni*) and their hybrids show luxuriation and complete fecundity."

Barker, R. J. **DDT Absorption and Degradation in House Flies of Varied Age.** *J. Econom. Entom.* 1957, Aug., v. 50, No. 4, 499–500.

"The total DDT degradation in treated house flies is essentially unchanged by age. However, in younger flies the predominant degradent is not detectable in ether extracts by a modified Schechter-Haller analysis. In older flies, the dehydrochlorination product, DDE, is found in increasing quantity. Application of DDE to flies of varied ages might reveal if this effect of age is due to competition with the dehydrochlorinase or to metabolism of DDE to an undetectable product."

Reid, E. T. M. **Notes on the Distribution of Stomoxydinae (Dipt., Muscidae) in the Southern Sudan.** Reprinted from *Entomologist's Monthly Magazine*. 1956, Dec. 28, v. 92, 343–6, 1 fig.

Barretto, M. P. Tabânidas da Guiana Inglêsa, com as descrições de seis novas espécies da fauna guiano-amazónica (Diptera, Tabanidae). [**Tabanids of British Guiana with a Description of Six New Species from the Guiana—Amazon Regions**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Jan., v. 8, No. 1, 75–89. [29 refs.] English summary (7 lines).

Doury, P. Un cas myiase oculaire à *Oestrus ovis* Linné observé à Tamanrasset (Hoggar). [**Ocular Myiasis due to *Oestrus ovis* in Tamanrasset, Algeria**] *Arch. Inst. Pasteur d'Algérie.* 1957, June, v. 35, No. 2, 76–7. [10 refs.]

Beran, V., Prívora, M. & Samšinák, K. K výskytu roztoče *Ornithonyssus bacoti* (Hirst, 1913) v Československu. [**The Occurrence of Tropical Mite *Ornithonyssus bacoti* in Czechoslovakia**] *Českoslov. Parasit.* Prague. 1956, v. 3, 13–18, 5 figs. on pl. [26 refs.] English summary (7 lines).

Chen, H. H., Lien, J. C. & Tseng, P. T. **Comparative Effect of House Cleaning and Antimalarial Residual DDT House Spray for Bedbugs, Fleas, and Cockroaches in Taiwan.** *J. Formosan Med. Ass.* 1956, Nov., v. 55, No. 11, 562–7.

The people of Taiwan (Formosa) have two general house-cleaning operations a year. This report compares the effect of these operations on the house infestation of fleas, bed-bugs and cockroaches with that of DDT residual spraying in one of the townships.

The infestation rates of bed-bugs, fleas, and cockroaches in uncleaned and unsprayed houses were 21·93%, 10·96% and 15·69%, respectively. House cleaning proved ineffective in the control of bed-bugs, fleas and cockroaches, although it has its obvious advantages of removing dust, food particles, and larvae and pupae of these pests.

Residual house-spraying with 75% DDT wettable powder as an antimalarial measure was sufficient to kill all bed-bugs and fleas. Its effect on cockroaches was also very good. *W. Z. Coker*

Gorecki, P. Contribution à l'étude de la porocéphalose nymphale. [**A Case of Pentastome Infection**] *Ann. Soc. Belge de Méd. Trop.* 1957, Apr. 30, v. 37, No. 2, 259–61. [12 refs.]

The English summary appended to the paper is as follows.—

"A case of nymphal porocephaliasis showed localization in the right lung and in the left superior quadrant of the abdomen. The patient's

case history showed complaints of occasional pain in the thorax. In the anamnesis: a pneumonia of unusual evolution. The radiographs showed calcified intrathoracic larva and an abdominal larva."

TARSHIS, I. B. **An Apparatus and Technique for the Continuous Anesthetization of Haematophagous Insects with Dry Ice.** *Mosquito News.* 1957, June, v. 17, No. 2, 83–6, 2 figs.

PAULINI, E. & FOMM, A. S. Estudo relativo a fatôres ligados ao inseticida e à sua aplicação que influem sôbre a eficácia da desinsetização domiciliária: I—Comparação de vários bicos aspersores empregados pelo S.N.M. e qualificação de sua aspersão. [**Factors Relating to Insecticides and their Application which Influence House Spraying. I. Comparison of Different Nozzles Used by the National Malaria Service and their Spraying Performance**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Apr., v. 8, No. 2, 311–54, numerous charts. English summary.

MISCELLANEOUS PAPERS

i. GEBER, Marcelle & DEAN, R. F. A. **The State of Development of Newborn African Children.** *Lancet.* 1957, June 15, 1216–19, 6 figs.

ii. WILLIAMS, Cicely D. **The State of Development of Newborn African Children.** [Correspondence.] *Lancet.* 1957, July 13, 93–4.

i. "The technique of neurological examination evolved by André Thomas in European children is described.

"107 newborn African children who were considered to be normal at birth were examined by this method.

"They proved to be at a more advanced state of development than newborn European children.

"The advance was shown chiefly by a lesser degree of flexion, by a remarkable control of the head, and by the frequent absence of primitive reflex activity.

"The results were consistent with clinical observations and Gesell tests made on young African children."

The authors have also compared these African babies with European and Asian babies born in Kampala. Climate therefore was not an important factor in assessing the differences.

[Ability to hold up the head largely depends on the length of the

neck, which is often short in Africans. Most of these babies were tested less than 48 hours after birth. The amount of handling and active attention babies get within a few hours may make a considerable difference to behaviour. It would be interesting to know how much time these African babies spent in their mothers' arms or beds compared with their European and Asian contemporaries. The film made by Margaret Mead of a newborn baby in New Guinea demonstrates this admirably. The authors state "The African child sucks vigorously at the breast almost from the first hour". How many European babies are even given a chance of doing this? It is generally recognized that the sucking reflex is active very soon after birth, but if it is not elicited, then it may diminish. It would also be interesting to know what proportion of each racial group were first-born. In fact, were the mothers experienced with babies?] *Cicely D. Williams*

ii. The comment on the paper by Geber and Dean (above) contains the substance of this letter. *Charles Wilcocks*

Kumar, A., Agarwal, K. L., Kumar, S. & Mangalik, V. S. **Electrophoretic Study of Serum Proteins in Normal Indians.** *Indian J. Med. Sci.* 1957, June, v. 11, No. 6, 398–404, 3 figs. [28 refs.]

This publication from the Department of Pathology, Lucknow University, is concerned with establishing normal serum protein values for Indians. 72 persons varying from 20 to 52 years of age were studied. They all seemed to be in good health. The haemoglobin value was above 13·5 gm.% in each instance. The majority of them were, in fact, doctors or blood donors. The total serum protein value was determined by the Kjeldahl technique and the various fractions were demonstrated by filter-paper electrophoresis. After electrophoresis, various fractions were stained and the percentage of the different protein fractions was determined by the measurement of the eluted dye. The mean albumin : globulin ratio was 1·70 with a standard deviation of 0·65. The proportion of albumin and the alpha- and beta-globulins corresponded well with those obtained in other parts of the world. The percentage of gamma globulin was, however, much higher than surveys had shown it to be by various workers in Sweden, the United States or Great Britain. It compared with results seen in Africa and one previous investigation carried out on medical students in India [Satoskar and Lewis, this *Bulletin*, 1955, v. 52, 392]. Whereas in the first group the percentage of gamma globulin was about 13, the previous surveys in Africa and India had shown it to be about 25 and in this series it was found to be 20. It has been thought that the higher gamma globulin level in the tropics is due to repeated infections developing in early childhood [*ibid.*, 1952, v. 49, 76] and the present finding would agree with this conception.

H. Lehmann

DE SMET, M. P. & LAHON, H. Manométrie splénique et splénoportohépatographie transpariétale. Une étude de 100 cas chez les congolais. [**Splenomanometry and Splenoportography. Study of 100 Africans in the Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1957, Apr. 30, v. 37, No. 2, 225–43, 6 figs. on 3 pls. [28 refs.]

The English summary appended to the paper is as follows:—

"In a series of 100 natives examined by splenomanometry and splenoportography, the normal and pathological values were found to be equal to the European values.

"As a preparation for surgery of the upper abdomen and as a control of cirrhosis of the liver, the value of the methods is stressed."

VAUCEL, M. Les acquisitions de la médecine tropicale dans ces cinquante dernières années. [**Advances in Tropical Medicine in the Last 50 Years**] *Ann. Soc. Belge de Méd. Trop.* 1956, Oct. 31, v. 36, No. 5 *bis*, 655–64.

GELFAND, M. **David Livingstone—the Doctor.** *Central African J. of Med.* 1957, July, v. 3, No. 7, 278–90, 3 figs.

REPORTS AND SURVEYS

COLONIAL OFFICE. **The Colonial Territories 1956–1957.** Cmd. 195. pp. xxv + 185. 1957, June. London: H.M. Stationery Office. [7s.]

As usual this is a most informative and clearly written account of the Colonial Territories. Constitutional and economic subjects occupy much of the space, but the social services receive serious notice, and the sections on medical and health services, and medical research, provide a readable account of great value to Members of Parliament—for whom the report is intended—and also to medical administrators themselves. The importance of the report is that in it the implications of the activities of the medical departments and the relevance of research are explained, and the trends in disease are described and assessed.

In the general review of the medical and health services the special emphasis now placed on preventive medicine is mentioned. The pattern of disease is changing towards that of temperate climates. Mass campaigns (notably against yaws) are proving successful. One of the chief difficulties is still the recruitment and training of staff; there were vacancies for 135 doctors at the end of 1956, and many more nurses

and auxiliaries are needed. The medical schools in Malta, Malaya, Hong Kong, the West Indies, Nigeria, Uganda and Fiji, however, are progressive institutions, most of which reach the standard required by the General Medical Council for registration in the United Kingdom. Training schools for auxiliary staff are being extensively increased.

The report emphasizes the administrative action taken in the different countries to improve health education, the school medical services, infant and child welfare, the services for venereal disease, and mental health.

The epidemic and endemic diseases are discussed very briefly, mention being made of the epidemics of cerebrospinal fever which continue to be disastrous in West Africa; of smallpox which is still troublesome; sleeping sickness which is a constant threat but which has receded notably; relapsing fever which though still serious is yielding to insecticides; yaws with its enormous campaigns and encouraging results; malaria with its conspicuous successes in British Guiana, Mauritius, Cyprus and elsewhere, and the important experiments on control in East and West Africa; yellow fever; onchocerciasis; tuberculosis which, though being controlled in several countries, is "undoubtedly the greatest problem faced by governments"; leprosy for which great treatment campaigns are maintained in East and West Africa, the West Indies, the Fiji Islands and elsewhere; and poliomyelitis which in its unpredictable way may increasingly be a problem in the future.

The medical section of the report ends with a few remarks on new hospitals opened and on the extension of health centres and mobile units, and on the cooperation achieved with international organizations.

The research projects mentioned relate to trypanosomiasis (whose importance is now perhaps not primarily medical); malaria (in Tanganyika the experiment on spraying 15,000 huts with residual insecticides "has after two years achieved such success that the occurrence of malaria amongst 50,000 inhabitants is now the exception rather than (as formerly) the rule"—other even larger projects are in hand elsewhere in Africa); helminthiasis (especially filariasis); virus diseases; leprosy; tuberculosis; nutrition and sickle-cell anaemia. The point is made that some types of research are better done in Britain than in the Colonies themselves, and a list is given of institutions collaborating for this purpose.

The report as a whole gives only the outlines of the work being done, but it has the advantage of being a readable summary and interpretation of a situation otherwise reflected only in separate, detailed annual reports of the countries and departments. It is brief, but it is accurate. The research projects will no doubt be more fully dealt with in the volume on Colonial Research, normally issued each year but later than the present report.

Charles Wilcocks

BOOK REVIEWS

MANSON-BAHR, Philip H. [C.M.G., D.S.O., M.A., M.D., F.R.C.P., D.T.M. & H.] **Synopsis of Tropical Medicine.** 3rd Edition. pp. xiii + 287, 8 pls. 1957. London: Cassell & Co. Ltd., 37/38, St. Andrew's Hill, E.C.4. [22s. 6d.]

The outstanding virtue of this synopsis is its comprehensiveness, for it gathers within some 260 pages a wealth of information which is astonishing. The description of each group of diseases, after a broad definition, begins with most valuable geographical data, continues with detailed entomological and parasitological aspects, then passes on to the pathological and clinical features and finally outlines the treatment. Thus, it takes but a few moments to look up the dimensions of the microfilaria of *Acanthocheilonema* [*Dipetalonema*] *perstans* or the agents which transmit tularaemia, and this in a volume whose bulk is less than that of a modern novel.

The present edition contains a therapeutic glossary arranged in alphabetical order, which lists the drugs of proved value in the modern treatment of tropical disease, together with the indications for each and guidance as to dosage. Since the number of such drugs has increased rapidly of recent years, and for efficient therapy the dosage of most of them must be accurately related to body weight, this index is of the greatest value. The author's decision to insert it in place of the list of special laboratory methods contained in earlier editions [this *Bulletin*, 1952, v. 49, 1088] will receive the approbation of all clinicians.

The work reveals some touches of conservatism very personal to the author. It is interesting to note in the chapter on malaria that the use of oral and intramuscular preparations of quinine under certain circumstances is still advocated, and that for the relief of vomiting in blackwater fever the application of turpentine stupes or mustard plasters to the epigastrium still has a place, while dry cupping and "hepatic phlebotomy" are recommended as adjuvant methods of treatment in amoebic hepatitis.

A work which is designed to include all possible information in the smallest reasonable compass can clearly not debate the relative advantages of alternative lines of treatment, and it is inevitable therefore that selection must be subservient to comprehensiveness. For detailed therapeutic advice, full-scale textbooks and monographs must be consulted in addition to this volume.

Modern views on the natural history and classification of leprosy are still short of unanimity, and since a synopsis cannot set them out in detail, the relevant chapter reflects a justified conservatism. The chapter on nutritional diseases, which includes sprue, might perhaps have been expanded in view of the universal importance of this factor in all tropical disease. The manifestations of riboflavin deficiency, the

commonest specific avitaminosis throughout the tropics, are briefly described, but nutritional megaloblastic anaemia is not mentioned, while the spinal, optic and auditory neuropathies which gained great prominence on the release of Allied prisoners held by the Japanese, and which are still of frequent occurrence in tropical Africa, receive minimal attention. An omission is also noted in the fascinating chapter on vegetable poisons in which the important veno-occlusive disease of the liver in West Indian children gains no place.

The standard of printing is good and only very rare errors will be found. These include the transposition of numbers 3 and 4 on Plate III, illustrating Leishman-Donovan bodies, "jaws" printed for "yaws" on p. 185, and primaquine stated to be a 4-aminoquinoline on p. 14, instead of an 8-aminoquinoline.

This edition represents a notable accumulation of well-arranged and instantly accessible data bearing on every aspect of tropical disease, together with a therapeutic index of the greatest value, contained in a volume of convenient size and weight and at a most reasonable price. Every clinician practising tropical medicine should—and can readily—have it at hand. *J. H. Walters*

Rodenwaldt, Ernst & Jusatz, Helmut J. [Edited by.] **Welt-Seuchen-Atlas** [World Atlas of Epidemic Diseases] Part III. 1st issue. pp. III/7–III/10, III/25–III/30, III/55–III/60, III/79–III/82, III/87–III/96, III/105–III/106, III/119–III/122, 1 text fig. & 10 folding pp. of coloured maps. [1957.] [In German & English.] Hamburg 1: Falk-Verlag, Burchardstrasse 8. [DM 75.–.]

The criteria by which the cartographic exposition of geographical pathology must be judged have been set by previous issues of this Atlas [this *Bulletin*, 1955, v. 52, 499; 1956, v. 53, 951; 1957, v. 54, 246, 247]. They include the clarity and sufficiency of material displayed on the map, an authoritative account which expands the illustrated material, and a bibliography from which the original sources can be traced, the three enabling the reader to proceed from visual impression, through descriptive account to original sources. The Editors' methods are now becoming stabilized in a sound form. The maps give a clear idea of distribution and incidence with a decreased effort at demonstration of history, while a standardized mechanism has been adopted to show the alternative hosts in different cases.

The accounts of brucellosis in Europe by W. Wundt and of plague in America by H. Raettig fulfil these criteria well, and by their triple approach constitute an excellent presentation. The account of yellow fever in America by F. O. Höring and H. Höring does not fully meet them; the map is good but the presentation of a text is relatively slight and the references, 18 in number, are inadequate as a basis of further study by

a serious student. The account of rabies in Africa by G. SCHOOP and E. KAUKER returns to the general standard though the delineation of enzootic areas is too clearly political for realism. Leishmaniasis in America is ably described with a good bibliography by G. PIEKARSKI, W. HENNIG and W. SIBBING though the material available for cartographic display is relatively small. Schistosomiasis in Africa is very capably expounded by M. M. DAWOOD and A. GISMANN in whose hands the method reaches its height of value with 2 maps of *Schistosoma haematobium* and *S. mansoni* with their vectors, the joint text on the subject and the bibliography together constitute an admirable review, which is approached in value by the account of *S. mansoni* in South America by G. JANSEN. The distribution of three species of filarial worm in South America is recorded by A. ERHARD and U. WELLENSIEK, with a good account and an excellent bibliography though once again the material available for cartographic display does not fully justify the scale of the map. The final map on the distribution of population in Central and South America by F. BURGDÖRFER is, like previous maps of this nature, excellent. The subject can be almost fully understood from a study of the map alone though the accompanying text and bibliography are of a high standard. *G. Macdonald*

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